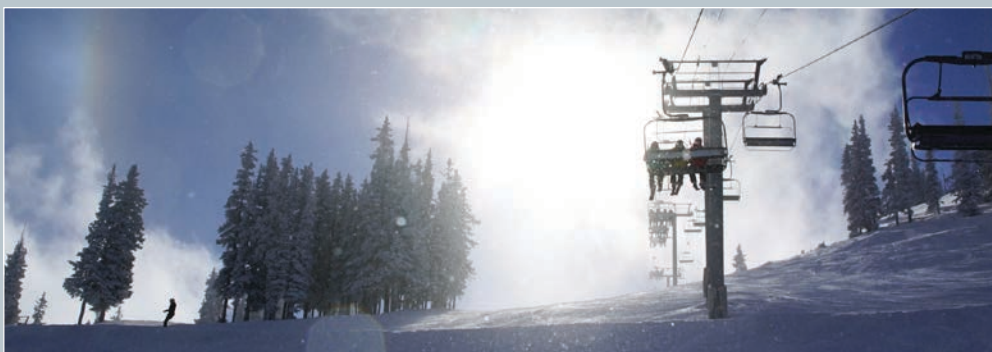




ASPEN MOUNTAIN PANDORA DEVELOPMENT AND SUMMIT SNOWMAKING PROJECTS ENVIRONMENTAL ASSESSMENT

November 2018



USDA Forest Service
Rocky Mountain Region
White River National Forest



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List of Hyperlinks Provided in this EA

EMBEDDED LINK	URL
webpage	https://www.fs.usda.gov/project/?project=53847
2002 WRNF Land and Resource Management Plan (Forest Plan)	https://www.fs.usda.gov/detail/whiteriver/landmanagement/?cid=fsbdev3_001228
2018 Aspen Mountain Master Development Plan	https://www.fs.usda.gov/detail/whiteriver/landmanagement/planning/?cid=STELPRD B5333326
Management Area 7.1 – Intermix	https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_000999.pdf
Management Area 8.25 – Ski Areas (Existing and Potential)	https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_000999.pdf
Notice of Proposed Action (NOPA)	https://www.fs.usda.gov/nfs/11558/www/nepa/109153_FSPLT3_4298833.pdf
16 U.S.C. § 497	https://www.gpo.gov/fdsys/pkg/USCODE-2011-title16/pdf/USCODE-2011-title16-chap2-subchapl-sec497.pdf
40 CFR § 1508.27	https://www.gpo.gov/fdsys/pkg/CFR-2012-title40-vol34/pdf/CFR-2012-title40-vol34-sec1508-27.pdf
40 CFR § 1502.25(b)	https://www.gpo.gov/fdsys/pkg/CFR-1996-title40-vol18/pdf/CFR-1996-title40-vol18-sec1502-25.pdf
40 CFR § 1502.15	https://www.gpo.gov/fdsys/granule/CFR-2012-title40-vol34/CFR-2012-title40-vol34-sec1502-15
Scenery Management System	https://www.fs.fed.us/cdt/carrying_capacity/landscape_aesthetics_handbook_701_no_append.pdf
Built Environment Image Guide	https://www.fs.fed.us/recreation/programs/beig/01_frontmatter.pdf
Southern Rockies Lynx Management Direction	https://www.fs.usda.gov/detail/r2/landmanagement/planning/?cid=stelprdb5356865
FSM 2670.32	https://www.fs.fed.us/cgi-bin/Directives/get_dirs/fsm?2600!..

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Acronyms and Abbreviations

ASC	Aspen Skiing Company	NRHP	National Register of Historic Places
ATV	All Terrain Vehicle	PDC	Project Design Criteria
BA	Biological Assessment	SHPO	State Historic Preservation Office
BE	Biological Evaluation	SIO	Scenic Integrity Objective
BEIG	Built Environment Image Guide	SMS	Scenery Management System
BMP	Best Management Practices	SUP	Special Use Permit
CAA	Clean Air Act	TEP	Threatened, Endangered and Proposed
CCC	Comfortable Carrying Capacity	USDA	United States Department of Agriculture
CDA	Connected Disturbed Action	USEPA	United States Environmental Protection Agency
CDPHE	Colorado Department of Public Health and Environment	USFWS	United States Fish and Wildlife Service
CEQ	Council on Environmental Quality	USGS	United States Geological Survey
CFR	Code of Federal Regulations	WCC	Watershed Condition Classification
CFS	Cubic Feet per Second	WCPH	Watershed Conservation Practices Handbook
CPW	Colorado Parks and Wildlife	WRNF	White River National Forest
CWCB	Colorado Water Conservation Board		
DAU	Data Analysis Units		
DN	Decision Notice		
DSGS	deep-seated gravitational spreading		
EA	Environmental Assessment		
FONSI	Finding of No Significant Impact		
FSH	Forest Service Handbook		
FSM	Forest Service Manual		
GHG	Greenhouse Gases		
ID Team	Interdisciplinary Team		
LAU	Lynx Analysis Unit		
MDP	Master Development Plan		
MM	Management Measure		
NAAQS	National Ambient Air Quality Standards		
NAGPRA	Native American Grave Protection and Repatriation Act		
NEPA	National Environmental Policy Act		
NFMA	National Forest Management Act		
NFS	National Forest System		
NHPA	National Historic Preservation Act		
NOPA	Notice of Proposed Action		
NRCS	Natural Resources Conservation Service		

Chapter 1. Purpose and Need

1.1 INTRODUCTION

The set of projects analyzed in this document constitutes a federal action, which has the potential to affect the quality of the physical, biological, and human environment on public lands administered by the United States Forest Service (Forest Service). As such, these projects must be analyzed pursuant to the National Environmental Policy Act of 1969 (NEPA). Under NEPA, federal agencies must carefully consider environmental concerns in their decision-making processes and provide relevant information to the public for review and comment.

The White River National Forest (WRNF) has prepared this Environmental Assessment (EA) in compliance with NEPA and other relevant federal and state laws and regulations. This EA contains analyses consistent with NEPA, Council on Environmental Quality (CEQ) regulations, and Forest Service policy. It discloses potential direct, indirect, and cumulative environmental effects on the human and biological environment anticipated to result from implementation of the Proposed Action. Additionally, it is intended to ensure that planning reflects the opportunities and constraints posed by the immediate and surrounding area and that it minimizes potential resource conflicts.

Technical reports providing detailed information on each resource analyzed in this EA were completed by specialists to inform the analysis and are summarized within each resource section. These technical reports can be found in their entirety on the Forest Service [webpage](#). The entire project file can be found at the Aspen-Sopris Ranger

District office of the WRNF, available upon request.

1.2 BACKGROUND

Aspen Mountain is owned and operated by Aspen Skiing Company (ASC). The ski area is located in the City of Aspen, Colorado, which is approximately 105 miles southwest of Denver, Colorado (refer to **Figure 1**). Aspen Mountain is different from other resorts on the WRNF in that most of the land on which the ski area exists is privately owned (63 percent), with the remainder being composed of National Forest System (NFS) lands (37 percent). The portion of the ski area on NFS lands is managed by the Aspen-Sopris district of the WRNF under a special use permit (SUP). The [2002 WRNF Land and Resource Management Plan](#) (Forest Plan) provides general standards and guidelines for Aspen Mountain's activities and operations on NFS lands (USDA Forest Service 2002). The SUP and associated summer and winter operating plans, as well as other resource management documents, provide more specific guidance for ski area operations and projects. **Figure 2** depicts the current conditions at Aspen Mountain.

All project components are included in the accepted [2018 Aspen Mountain Master Development Plan](#) (MDP). With the exception of a portion of the proposed Pandora terrain development, all other project components are within Aspen Mountain's existing SUP area or adjacent private lands owned by ASC. Because a portion of the proposed Pandora terrain area is not currently part of Aspen Mountain's existing SUP, the proposed development would require a ski area SUP area boundary adjustment. To achieve a no net increase of the SUP area, certain lands would be reallocated from [Management Area 7.1 – Intermix](#) to [Management Area 8.25 – Ski Areas \(Existing and Potential\)](#), while an equal amount of lands currently within the

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SUP area and Management Area 8.25 would be removed from the SUP area and reallocated to Management Area 7.1. As part of this planning and decision-making process, an amendment to the Forest Plan would be necessary to accomplish this boundary adjustment. In addition, amendments to ASC's Aspen Mountain Powder Tours SUP would be required to remove overlap with the adjusted Aspen Mountain SUP in the Pandora area.

A full description of the project can be found in **Section 2.2.1**. Contingent upon the NEPA process, implementation of any approved project could potentially begin as early as summer 2019.

1.3 PURPOSE AND NEED OF THE PROPOSED ACTION

In its 2018 MDP, ASC identified a need for enhanced terrain variety, improved skier circulation, and additional snowmaking coverage that would collectively address the skier recreation experience at Aspen Mountain. The Forest Service, through acceptance of ASC's 2018 MDP and internal scoping, has identified the need for:

- ◆ **Additional undeveloped, minimally maintained lift-served terrain and additional traditionally cleared alpine trails to enhance the existing terrain variety and skiing experiences at Aspen Mountain**
- ◆ **Improved skier circulation on the upper portion of the east side of the mountain**
- ◆ **Reliable and consistent snow coverage on the upper mountain, especially during the early and late parts of the season, while reducing peak flows and sediment entering Spar and Keno Gulch**

The existing conditions driving these needs are further described in this document.

- 1) Provide a mixture of additional undeveloped, minimally maintained lift-served terrain and additional traditionally cleared alpine trails to enhance the existing terrain variety and skiing experiences at Aspen Mountain**

According to a recent report in Ski Magazine's Reader Resort Ratings, terrain variety is consistently ranked as the second most important factor in guest satisfaction, behind snow quality. This is a relatively recent industry trend and demonstrates a change in skier expectations. While the existing traditionally cleared trails remain popular at Aspen Mountain, an increasing number of its guests seek undeveloped terrain as well as traditional trails located within more natural-appearing and remote settings. This trend is evidenced by the increased use of Aspen Mountain's side-country terrain—the areas immediately outside of and adjacent to the ski area boundary that are lift-served.

Aspen Mountain's existing terrain network totals 699 acres, including 475 acres of mostly groomable traditional trails that are fully cleared of trees, and 224 acres of "undeveloped" advanced and expert ability level terrain. Aspen Mountain's ratio of traditionally cleared trails to undeveloped terrain within its operational boundary is relatively low compared to other ski areas on the WRNF. As Aspen Mountain exists entirely below tree line, glades (both human-made and naturally occurring) are the only means Aspen Mountain has of offering undeveloped terrain. Aspen Mountain's existing gladed terrain largely exists as tree islands between traditionally cleared runs, and the majority of glades are less than 10 acres in size.

There is a need for additional undeveloped lift-served terrain in the form of larger contiguous gladed areas that contain a variety of natural skiable features (such as

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rocks, cliff bands, gullies, and chutes) not currently present within Aspen Mountain's existing gladed areas. Further, Aspen Mountain has a need for intermediate level glades, which are not currently offered within the existing operational boundary.

There is a need for traditionally cleared ski trails that offer variety from those currently available on Aspen Mountain. For many skiers who prefer not to enter undeveloped terrain, there is a lack of traditionally cleared terrain that provides a more natural and secluded setting. Development of new lift-served gladed areas would also necessitate the construction of associated traditional trails to support skier circulation and operations within the gladed area. The associated traditional trails would be necessary to provide terrain during the early season, periods of poor or undesirable snow conditions, and other situations when gladed terrain may not be skiable. The associated traditional trails would also provide access to/egress from a lift for guests, and to facilitate ski patrol response.

2) Improve skier circulation on the upper portion of the east side of the mountain.

The upper portion of the east side of Aspen Mountain within the current operational boundary is presently underutilized, with several areas of uphill or flat terrain that diminish the guest experience. Trails such as *Walsh's*, *Hyrup's*, and *Kristi's* offer quality expert terrain but currently terminate at *Lud's Lane* and require a short return hike out to the *Lud's Lane* exit if guests wish to repeat the terrain. To eventually return to the existing Gent's Ridge lift, walking or skating is required along an approximately 1,200-foot-long stretch of flat terrain at the terminus of *Northstar*. These hikes shorten the skiable terrain and limit repeat use of the area. In addition, access to the Sundeck Restaurant at the summit of Aspen Mountain from the

existing Gent's Ridge lift requires traversing uphill 300 linear feet.

3) Provide reliable and consistent snow coverage on the upper mountain, especially during the early and late parts of the season, while reducing peak flows and sediment entering Spar Gulch and Keno Gulch.

The existing snowmaking system provides coverage on the mountain's lower slopes, at elevations below 10,600 feet. This system was installed in 1981 and currently provides 172 acres of critical coverage, especially at the lower elevations, to provide adequate skiing/riding conditions both in the early and late parts of the season. Snowmaking infrastructure on the upper mountain is needed to provide an effective connection from this portion of the mountain to the lower slopes, allowing for top-to-bottom skiing throughout the season. During seasons with minimal early season snowfall, top-to-bottom skiing can be delayed from the planned opening day, which reduces the available terrain offerings and places a financial burden on resort operations. The Silver Queen Gondola provides the primary uphill access from the base area and its unload point is on the upper mountain, meaning that a critical need exists for upper mountain snowmaking infrastructure to ensure a connection from the Silver Queen Gondola unload point to the lower intermediate slopes.

In addition, snowmaking infrastructure on the upper mountain is needed to provide the minimum conditions required to host the World Cup ski races. These races are typically scheduled in late November on Thanksgiving weekend and have become an important part of the community's early season economy.

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1.4 PUBLIC INVOLVEMENT AND IDENTIFICATION OF ISSUES

In May 2018 a [Notice of Proposed Action](#) (NOPA) was mailed to 57 community residents, interested individuals, public agencies, tribal governments, and other organizations. This notice was specifically designed to elicit comments, concerns, and issues pertaining to the Proposed Action. A legal notice was published on May 16, 2018 in the *Glenwood Springs Post Independent*, the newspaper of record for the WRNF, announcing the opportunity to comment on the Proposed Action. A public open house was held on May 23, 2018 at the Limelight Hotel (355 South Monarch Street, Aspen, Colorado 81611) from 5:00 p.m. to 7:00 p.m. Two members of the public attended the meeting. The comment period closed on June 15, 2018. In response to the Forest Service's solicitations for public comments, 20 letters were received.

From these letters, substantive comments were extracted and categorized by resource area. The Forest Service identified specific areas of concern and classified them as either "issues" or "non-issues." Preliminary direct and indirect environmental consequences based on data collected through fieldwork and other research conducted in 2018 were presented in the [NOPA](#). Substantive comments are addressed in a Response to Comments document located on the project website and in the project file. The Forest Service considered the information gathered through public scoping along with the input of the Forest Service Interdisciplinary Team (ID Team) in identifying specific resources that require in-depth analysis in **Chapter 3** of this EA.

Resources and issues that are analyzed in detail in this EA are included in **Table 1-1**. Resources and issues not carried forward are include in **Table 1-2**.

***Issues* may warrant the generation of an alternative, can be addressed by Project Design Criteria or mitigation, or generally require in-depth analysis and disclosure.**

***Non-issues* are beyond the scope of the project, are already decided by law, regulation or policy, or are not relevant to the decision.**

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Table 1-1. Issues Analyzed in Detail

RESOURCE AREA	ISSUE
Recreation	The Proposed Action may alter the existing recreation experience on NFS lands within and outside of the Aspen Mountain SUP boundary.
Scenery	The Proposed Action could alter scenic resources within the currently undeveloped Pandora area as viewed from Highway 82, Independence Pass, and adjacent NFS lands in close proximity to the project area.
Cultural	Implementation of the Proposed Action could disturb previously unidentified archaeological resources in approximately 70 acres of the project area that have not been surveyed.
Wildlife and Fish	<ol style="list-style-type: none"> 1) The Proposed Action may result in the alteration and/or removal of primary and secondary vegetation for Canada lynx within the project area. 2) The Proposed Action may impact individual elk and Forest Service sensitive terrestrial species within the project area.
Watershed	Implementation and utilization of additional snowmaking infrastructure within the SUP area, including water storage ponds, may affect surface erosion and channel stability in small drainages on Aspen Mountain.
Soils and Geotechnical	<ol style="list-style-type: none"> 1) Increased snowmelt and runoff associated with additional water on Aspen Mountain from the proposed snowmaking may affect slope stability. 2) Grading associated with the Proposed Action may impact soil resources.
Vegetation	The Proposed Action would involve ground disturbing activities that may affect sensitive plant species.
Air Quality	The Proposed Action would result in construction and operation-related emissions, which may affect the Aspen PM10 National Ambient Air Quality Standards (NAAQS) maintenance area and nearby Class I airsheds and contribute to climate change.

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Table 1-2. Resources and Issues Not Carried Forward

RESOURCE AREA	ISSUE
Traffic, Ski Area Access, and Parking	The Proposed Action is anticipated to create an increase in average annual visitation, which would generate additional vehicular traffic on roadways in Pitkin County; however, this additional traffic is anticipated to be negligible. The majority of Aspen Mountain's visitation is from destination guests that fly to Aspen-Pitkin County Regional Airport or to Denver International Airport and stay in Aspen or elsewhere in the Roaring Fork Valley for multiple days. All parking for Aspen Mountain is provided by the City of Aspen and parking resources would not be impacted by the Proposed Action.
Noise	The Proposed Action would introduce noise both during the construction phase (e.g., noise from construction equipment and the use of a helicopter) as well as during the operation phase (e.g., operation of the proposed lifts, snowmaking and grooming equipment). These operating conditions would be similar to surrounding areas within the Aspen Mountain SUP area.
Social and Economic Resources	The Proposed Action would create approximately less than four full-time equivalent positions (lift operators, ski patrol, etc.), and is anticipated to not create impacts to social resources within the community (county services, school systems, etc.). The project would have short-term positive economic impacts due to construction related activities. The project would also have minimal long-term positive economic impacts in the context of the overall economic area (Pitkin County), as the proposed project could generate additional skier visitation and revenue.
Environmental Justice	The Proposed Action would not disproportionately affect low income or minority populations because those portions of populations would still have access to all public lands and dispersed recreation opportunities.
Stream Health	There are no live streams located in the project area; therefore, a stream health analysis is not necessary for this project.

In addition, the project area does not contain the following resources:

- ◆ Wetlands (verified July 2018)
- ◆ Inventoried Roadless Areas
- ◆ Wild and Scenic Rivers
- ◆ Wilderness Areas or Wilderness Study Areas
- ◆ Floodplains (as defined by Executive Order 11988)
- ◆ Areas of Critical Environmental Concern

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Consistency with Forest Service Policy

These authorities allow the Forest Service to provide recreation opportunities to facilitate the use, enjoyment, and appreciation of National Forests. The Forest Service is authorized to approve certain uses of NFS lands under the terms of SUPs ([16 U.S.C. § 497](#)). Generally, SUPs for recreational developments are issued and administered for uses that serve the public, promote public health and safety, and protect the environment. The enabling authorities for the Forest Service are contained in many laws enacted by Congress and in the regulations and administrative directives that implement these laws.

- **The Organic Administrative Act (1897)**
- **The Weeks Act (1911)**
- **The Multiple Use Sustained Yield Act (1960)**
- **The Forest and Rangeland Renewable Resources Planning Act (1974)**
- **The National Forest Management Act (1976)**
- **The National Forest Ski Area Permit Act (1986)**
- **The Ski Area Recreational Opportunity Enhancement Act (2011)**

As part of this analysis, the Proposed Action and Purpose and Need were reviewed to determine consistency with management goals, objectives, and standards and guidelines that are general requirements for the administration of NFS lands as set forth by the Forest Plan, revised in 2002. The Proposed Action would require a Forest Plan amendment; under the National Forest Management Act and its implementing regulations at 36 CFR Part 219 (2012 Planning Rule), a plan may be amended at any time. Plan amendments may be broad or narrow, depending on the need for the change. For detailed information on management direction established by the Forest Plan that is applicable for this project, please refer to page 10 of the [NOPA](#). For information regarding the proposed Forest Plan amendment, please refer to **Appendix A**.

In accordance with Forest Service Handbook 1909.15, Chapter 40, Section 41.22, and 36 CFR § 220.7(b)(2)(ii) this EA will not include an analysis of the No Action Alternative. The Forest Service Handbook states:

A stand-alone no-action alternative is not required. However, the effect of taking no action should correlate closely with the purpose and need. In other words, the effects of not taking action should provide a compelling reason for taking action and, therefore, should be consistent with the purpose and need for action. (USDA Forest Service 2010).

Refer to **Section 2.2.2** for further discussion on this decision.

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1.5 DECISION TO BE MADE

Based on Forest Service and external public scoping, and evaluation of the context and intensity factors contained in [40 CFR § 1508.27](#), the Forest Service determined that an EA would be necessary to review, analyze, and document the potential impacts to the human and biological environment anticipated to result from the implementation of the proposed projects. This EA is a disclosure rather than a decision document and details the site-specific environmental analysis for the Proposed Action.

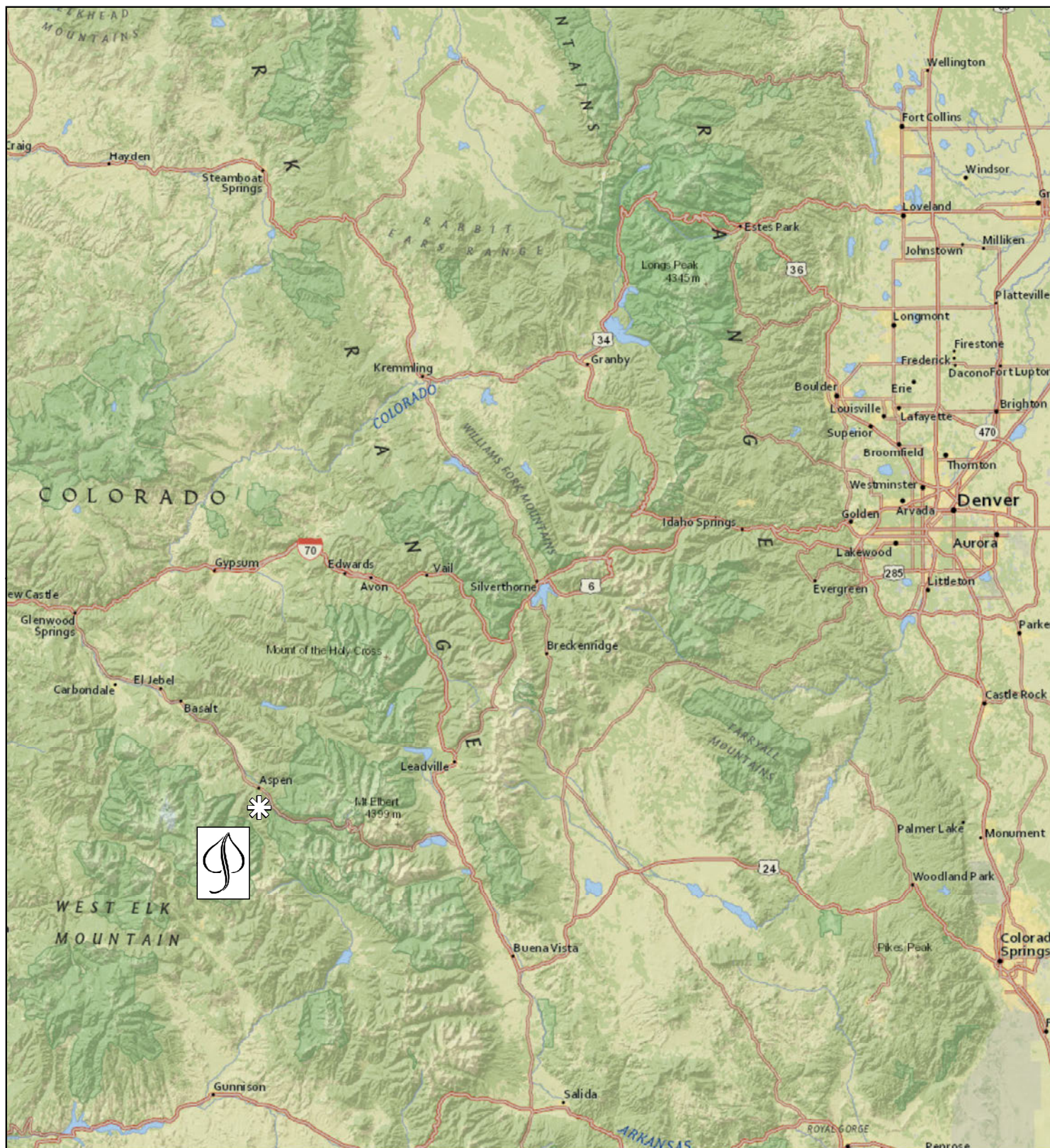
Based on the analysis documented within this EA, the Responsible Official (Scott Fitzwilliams, WRNF Forest Supervisor) will decide whether to allow implementation of the Proposed Action in whole or in part. The Responsible Official is not limited to allowing the Proposed Action or not, but may develop an entirely new alternative created from components of the Proposed Action analyzed in this EA. The decision document will include a determination of the significance of the effects and assess the decision's consistency with the [Forest Plan](#). Should a Finding of No Significant Impact (FONSI) determination be reached, a decision by the Responsible Official would be documented in a Decision Notice (DN).

In addition to determining whether or not to approve the implementation of the Proposed Action analyzed in this document, the Responsible Official will also specify conditions of approval to be implemented with the selection of an action alternative. The Responsible Official may also require additional Project Design Criteria (PDC) and/or best management practices (BMP) not discussed within this document. The responsible official may also require monitoring of PDC.

1.6 OTHER NECESSARY PERMITS, LICENSES, AND/OR CONSULTATION

Decisions by jurisdictions to issue or not issue approvals related to this proposal may be aided by the analyses presented in this EA (per [40 CFR § 1502.25\(b\)](#)). While the Forest Service assumes no responsibility for enforcing laws, regulations, or ordinances under the jurisdiction of other governmental agencies, Forest Service regulations require permittees to abide by applicable laws and conditions imposed by other jurisdictions. In addition to requisite Forest Service approvals, the following permits or approvals may be required to implement an action alternative:

- ◆ U.S. Fish and Wildlife Service, Endangered Species Act Informal Section 7 Consultation
- ◆ State Historic Preservation Office, National Historic Preservation Act, Section 106 Consultation
- ◆ State of Colorado, Stormwater Management Plan
- ◆ State of Colorado, Burn Permit



Pandora Development and Summit Snowmaking Projects Environmental Assessment

*Figure 1
Vicinity Map*



0 10 20 Miles






November 2018. Prepared by: **SE GROUP**



Pandora Development and Summit Snowmaking Projects Environmental Assessment

Figure 2
Existing Conditions

Existing

-  Chairlift
-  Snowmaking Coverage
-  Operational Boundary
-  SUP Area (MA 8.22)
-  Non-SUP NFS Lands (MA 7.1)



0 1,000 2,000 Feet

November 2018. Prepared by: **SE GROUP**

Chapter 2.

Description of Alternatives

2.1 INTRODUCTION

This chapter describes the alternatives considered within this environmental analysis and provides both the Responsible Official and the public with a clear understanding of the Proposed Action. PDC included to lessen or avoid impacts anticipated to occur as a result of implementation of the Proposed Action are also outlined.

2.2 ALTERNATIVES CONSIDERED IN DETAIL

The range of alternatives that the Forest Service ID Team considered for this analysis was bound by the Purpose and Need underlying the Proposed Action, as well as by the issues that arose from internal and external scoping (refer to **Section 1.4**). NEPA requires that an environmental analysis examine a range of alternatives, which are “reasonably related to the purpose of the project.” Furthermore, Forest Service Handbook 1909.15 directs the ID Team to “consider a full range of reasonable alternatives to the Proposed Action that address the significant issues and meet the Purpose and Need for the Proposed Action” (USDA Forest Service 2010). Additional alternatives were considered but were determined to be unreasonable and were therefore eliminated from detailed analysis. A discussion of these alternatives considered but eliminated from detailed analysis can be found in **Section 2.2.2** and includes a brief explanation of the reasons for their elimination.

2.2.1 Proposed Action

The Pandora Development and Summit Snowmaking Projects consist of various lift, terrain, snowmaking, and operational improvements associated with providing lift-served terrain in the Pandora area and addressing needs within Aspen Mountain’s existing operational area. A portion of the proposed Pandora area is outside of the existing operational and SUP areas, meaning that both the operational area and the SUP area would need to be adjusted to facilitate the project. While there would be no net increase in Aspen Mountain’s SUP area, Aspen Mountain’s operational area would be increased by 216 acres in total. ASC’s Aspen Mountain Powder Tours SUP would also be modified to remove those acres that would overlap with the modified Aspen Mountain SUP area. For additional information, refer to the *SUP/Operational Boundary Adjustments and Forest Plan Amendment* discussion later in this section. Pending Forest Service approval, ASC anticipates that construction could begin during the summer of 2019. The Proposed Action is depicted on **Figure 3**.

Pandora Lift

The Pandora lift is proposed as a top-drive, detachable quad chairlift that would provide access to the backside of Aspen Mountain and the 180 acres of trails and gladed terrain that are proposed there (refer to the *Pandora Trails* discussion later in this section for a detailed description of the 180 acres of trails that are proposed to be developed). A description of each component of the Pandora lift and land ownership is provided in **Table 2-1**.

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Table 2-1. Proposed Pandora Lift Description Summary

LIFT COMPONENT	DESCRIPTION	LAND OWNERSHIP
Slope Length	4,191 feet	NFS lands – 2,766 feet Private lands – 1,425 feet
Vertical Rise	1,220 feet	N/A
Average Grade	31%	N/A
Design Capacity	2,000 pph	N/A
Top Terminal	11,260 feet elevation	Private lands
Bottom Terminal	10,040 feet elevation	NFS lands

In addition to serving the proposed Pandora terrain, the proposed lift alignment was designed to allow the Pandora lift to service several existing trails on Aspen Mountain's east side such as *Walsh's*, *Hyrup's*, and *Kristie's*, and to lengthen this terrain. The top terminal would be located approximately 950 feet south and slightly east of the Silver Queen Gondola's top terminal and would serve the maximum amount of terrain within the Pandora area. The location of the top terminal was chosen to provide direct access to the Sundeck Restaurant. The bottom terminal would be located approximately 1,500 feet downslope of the existing lower boundary of *Walsh's*.

Access routes to the bottom terminal would be necessary for construction and annual maintenance. Approximately 3,000 feet of an existing and abandoned logging/mining road is present within the lower portion of the proposed Pandora area and would be used for temporary construction activities and later reclaimed (refer to the *Construction Practices* discussion later in this section). Long-term maintenance access would be provided by a

proposed access road/ski trail (Trail P12) from the bottom terminal to *Northstar* trail that includes a gabion wall (a retaining wall made of stacked stone-filled wirework containers) to cross an ephemeral drainage. From the intersection of Trail P12 with *Northstar*, the access road would follow *Northstar* south until the intersection with Loushin's Road. The access road would be approximately 4,300 feet in total length from the Pandora lift bottom terminal to the intersection with Loushin's Road, constructed with an average grade of 8 percent, and located primarily on NFS lands.

Electricity would be provided to the bottom terminal from a proposed powerline that would be buried along the proposed access road/P12 ski trail alignment; the upper segment of this power line would be buried on private lands. Electricity would be provided to the top terminal from a proposed buried powerline originating at the existing maintenance facility that would be buried within an existing access road.

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Pandora Trails

Approximately 79 acres of traditional trails and 101 acres of gladed trails would be developed within the Pandora area, for a total of 180 acres of new terrain at Aspen Mountain. Of these 180 acres, approximately 72 acres would be located on NFS lands and approximately 108 acres would be located on private lands.

All the terrain would be accessed by the proposed Pandora lift. Gladed terrain would consist primarily of expert- and intermediate-level terrain, while the traditional trails would provide a mixture of low-intermediate-, intermediate-, and expert-level terrain.

A detailed description of the proposed Pandora trails by ability level is provided in **Table 2-2**.

Table 2-2. Proposed Pandora Trails by Ability Level

TRAIL NAME	ABILITY LEVEL	ACRES
P1	Expert	8.9
P2	Expert	5.1
P3	Expert	1.9
P4	Intermediate	8.1
P5	Intermediate	6.4
P6	Intermediate	11.6
P7	Intermediate	1.2
P8	Intermediate	5.5
P9	Expert	7.1
P10	Expert	4.5
P11	Expert	3.5
P12	Intermediate	3.8
P13	Low Intermediate	0.8
P14	Expert	2.6
P15	Expert	6.5
Egress Route	n/a	2.0
G1	Gladed	101
Total		180.5

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Users would have several options to access these proposed trails: (1) via the mountain summit through existing expert-level terrain; (2) via repeat use of the proposed Pandora lift; or (3) via intermediate trails like the *Copper Trail*.

An egress ski trail would be constructed along the eastern-most edge of the planned operational boundary to return skiers to the Pandora lift bottom terminal. This egress trail would be constructed to a width of 20 to 30 feet. During winter operations, the proposed access road to the Pandora bottom terminal would be used as a ski trail to provide ski patrol snowmobile emergency access/egress to/from the area, or in the event of lift failure. Additionally, a public “snow road” would be constructed annually around the Pandora top terminal location for wintertime public motorized access between Richmond Ridge and Midnight Mine Road. Historically, the lands south of the Aspen Mountain summit are a mix of private and public properties to which the general public has access for winter travel. The public “snow road” would allow for the successful operation of the proposed Pandora area, while also providing continued public access

to lands historically permissible for winter travel south of the Aspen Mountain summit.

Details regarding the ski trail construction methodology, including tree removal and grading, are provided in the *Construction Practices* discussion later in this section. Minor modifications to ski trail alignments could be made based on actual ground conditions encountered during the construction phase and to achieve necessary grades; however, these modified alignments would be required to result in similar disturbance and impacts as described in this EA.

Summit Snowmaking

Additional snowmaking infrastructure is proposed for the summit of Aspen Mountain on six trails, covering approximately 53 acres in total (26 acres on NFS lands and 27 acres on private lands), and spanning from the highest elevation of the existing system to the summit of the mountain. A detailed description of the proposed additional snowmaking coverage by land ownership is provided in **Table 2-3** and depicted on **Figure 3**.

Table 2-3. Proposed Snowmaking Coverage by Land Ownership

TRAIL	PRIVATE LANDS (ACRES)	NFS LANDS (ACRES)	TOTAL (ACRES)
<i>One and Two Leaf</i>	3.6	5	8.6
<i>Silver Bell</i>	4.5	5.5	10
<i>Dipsy Doodle</i>	7	8	15
<i>Buckhorn</i>	2.9	3.6	6.5
<i>North American</i>	4.5	0	4.5
<i>Copper Trail</i>	4.4	3.6	8
Total	26.9	25.7	52.6

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This proposed snowmaking would require the installation of underground water/air pipes and electrical wiring, as well as the construction of the following supporting components:

- ◆ Pump station – A new approximately 1,500-square foot pump station would be constructed near the existing Gent’s Ridge Pond and entirely on NFS lands. The capacity of this pump station would be 1,800 gallons per minute.
- ◆ Gent’s Ridge 2 storage pond – An approximately 3.5-million gallon capacity storage pond would be constructed near the bottom terminal of the Gent’s Ridge lift and south of the existing Gent’s Ridge 1 storage pond. The surface area of the pond would be approximately 1 acre, with the majority of the surface area located on NFS lands.
- ◆ Gent’s Ridge 3 storage pond – An approximately 1.75-million gallon capacity storage pond would be constructed almost entirely on NFS lands and immediately south of the proposed Gent’s Ridge 2 storage pond. The surface area of the pond would be approximately 1 acre.
- ◆ One and Two Leaf/Silver Bell/Copper snowmaking pipeline – Approximately 1.6 miles of snowmaking pipeline would be buried near One and Two Leaf, Silver Bell, and Copper trails. Approximately 53 percent of this pipeline would be on NFS lands.
- ◆ Dipsy Doodle/Buckhorn/North American snowmaking pipeline – Approximately 1.5 miles of snowmaking pipeline would be buried near Dipsy Doodle, Buckhorn, and North American trails. Approximately 28 percent of this pipeline would be located on NFS lands.

- ◆ Gent’s Ridge 1 storage pond pipeline – An approximately 600-foot-long pipeline from the existing Gent’s Ridge 1 Pond would be buried to connect the pond to an existing pipeline, located entirely on private lands.

The new pump station and storage ponds would allow this upper mountain snowmaking infrastructure to operate independently from the existing snowmaking system on the lower mountain. Approximately 10 million gallons of water storage would be required to operate the new system. This additional water storage would allow snowmaking to be concentrated during periods of colder weather, which would minimize snowmelt and result in an overall improvement to the energy efficiency of the snowmaking system. Water storage on the upper mountain would also increase efficiency for the snowmaking system, by eliminating the need to run the lower mountain snowmaking pumps uphill (e.g., against gravity).

Because there are minimal on-mountain water sources available near the proposed storage ponds, the ponds would not be stream-fed and would instead be filled by surface runoff from immediate surrounding areas and by the snowmaking system as necessary, including the initial filling following construction. The ponds would be lined to avoid leakage, engineered to address overflow, and would be classified as non-jurisdictional by Colorado Division of Water Resources standards. The ponds would utilize natural topography of the surrounding area and would be designed to allow wildlife ingress and egress.

Snowmaking Runoff Management

Of the 53 acres of proposed snowmaking coverage, 29.7 acres would be located on ski trails within the Spar Gulch watershed. Spar

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Gulch flows along the front side of Aspen Mountain and discharges to the City of Aspen's storm sewer system. A portion of the surface runoff originating on higher elevations of the Spar Gulch watershed, including the proposed snowmaking, is intercepted by Summer Ditch, a drainage ditch predating the Aspen Mountain ski area that discharges into Keno Gulch located on the west side of Aspen Mountain. The remaining 23.1 acres of snowmaking would be located on terrain that drains towards unnamed channels (Tributary #1, Tributary #2, and Tributary #3) on the east side of the mountain.

To minimize the amount of additional runoff entering Keno Gulch during peak flow periods, a splitter box would be installed on Spar Gulch just above Summer Ditch to maintain current volumes of runoff diverted towards Keno Gulch. The remaining snowmaking runoff would flow down Spar Gulch. The size and design of the splitter box would be identified in final drainage management and design plans, which would be submitted to the Forest Service for review and approval prior to construction of the snowmaking improvements.

With the splitter box in place, runoff associated with the proposed snowmaking would enter the Spar Gulch channel. PDC have been incorporated into the Proposed Action to reduce the peak flow of runoff in Spar Gulch and runoff entering the City of Aspen's storm sewer system, as well as to reduce the amount of sediment associated with this runoff. Refer to **Table 2-4**.

The existing Gent's Ridge 1 storage pond and proposed Gent's Ridge 2 and Gent's Ridge 3 storage ponds would be used to capture and store runoff originating in the Tributary #1 and Tributary #2 watersheds for later use and/or discharge. The existing Gent's Ridge 1 storage pond and the proposed

Gent's Ridge 2 and Gent's Ridge 3 storage ponds would contain a combined on-mountain storage capacity of 26.9 acre-feet, though the amount of runoff entering the ponds may not be sufficient to fill the ponds to their maximum storage capacity. Following the end of the snowmaking season, typically in January, the ponds would remain empty until snowmelt is actively occurring at the higher elevation trails (late-May to mid-June), and the ponds would be allowed to fill. Should the ponds near their storage capacity, the outlet valves would be opened to allow water to drain and to maintain the ponds at or near capacity.

Construction Practices

The location of the Pandora lift top terminal has been selected to minimize the amount of ground disturbance and timber removal required and to retain vegetative screening and wind protection. The location of the Pandora lift bottom terminal would align with a natural land bench, reducing the amount of grading required for its installation. An approximately 25-foot-wide vegetative buffer would be maintained behind and below the bottom terminal to visually screen it from the valley below. The lift maze would be located on both sides of the bottom terminal, which would require approximately 50 feet of timber removal on either side of and behind the terminal location to provide adequate room for skier circulation and grooming.

Construction access to the Pandora terrain would occur using the existing Summer Road and Little Annie Road to the top terminal location. As previously discussed, approximately 3,000 feet of an abandoned logging/mining road would be used for temporary construction access to the lower terminal location as well as for timber skidding. The average width of the existing road is approximately 10 feet and would require widening to an average of

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approximately 14 feet to accommodate construction vehicles, and a width of approximately 25 feet at road turns. Following construction, the abandoned logging/mining road would be reclaimed to original (pre-road) contours and reseeded.

Snowmaking pipelines would be buried within a 5-foot-deep trench located within a 70-foot-wide construction corridor near the trail edges. Hydrants and/or electric pedestals would be spaced approximately 150 feet apart and connected to the main snowmaking pipeline by 2-inch-diameter buried lateral piping. Underground air pipelines and electrical wire would also be installed within the construction corridor. The entire 70-foot-wide construction corridor would be revegetated upon project completion.

ASC would place staging areas and log decks on private lands and within area of proposed disturbance or previously disturbed areas where feasible (refer to **Figure 3**). The proposed lift tower foundation concrete and tower materials would be transported to the respective sites by helicopter.

Tree Removal

Trails and gladed areas would be constructed by flush cutting the timber to minimize ground disturbance and preserve the surface soil horizon. Timber removal may be performed “over snow” to minimize ground disturbance. Where “over snow” timber removal is not feasible, timber would be removed conventionally with skidders and logging trucks.

Traditional trail development would utilize natural openings and glades to the extent practicable. The traditional trails would include interspersed tree clusters within each trail to provide a varied experience and to lessen impacts to the area’s scenic character. Construction of traditional trails would result

in 26 acres of vegetation removal on NFS lands and 24 acres of vegetation removal on private lands.

Glading would be conducted to open skiable lines while maintaining age and species class diversity of the tree stands. Approximately 30 to 40 percent of tree basal area would be cleared from gladed areas; however, some areas are naturally gladed and would require little tree removal. The shape of new openings and ski runs in the forest canopy would appear natural and blend into the surrounding vegetation. In gladed areas, where practicable, some amount of timber would be lopped and scattered parallel with the fall line. Within the 101 acres of proposed gladed terrain, approximately 12.7 acres of vegetation would be removed on NFS lands and 27.7 acres would be removed on private lands.

Given the vegetation clearing for traditional and gladed trails—as well as for the Pandora lift, access roads, skier egress trail, trail grading, power line construction, and snowmaking ponds development—approximately 106 acres of trees would be cleared. Assuming 40 tons of trees removed per acre and a truck capacity of 25 tons per load, this would result in approximately 4,226 tons of timber removed and would require approximately 169 truckloads to remove (338 roundtrip truck trips). This logging would occur over the course of June, July, and August and would result in approximately 2 truckloads per day (4 roundtrip truck trips per day). All trucks longer than 30 feet would travel along Castle Creek Road for approximately 6.8 miles and then turn left onto Little Annie’s Road for approximately 5.5 miles to reach Loushin’s Road and the project area. Trucks shorter than 30 feet long (single axle) may take the same route or the Aspen Mountain Summer Road.

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Grading

Grading would be necessary for the following project components:

- ◆ Top and bottom terminals of the Pandora lift
- ◆ New trail breakovers from flatter to steeper terrain
- ◆ Proposed Pandora boundary egress ski trail
- ◆ Pandora temporary construction access road
- ◆ Pandora long-term maintenance bottom terminal access road
- ◆ To remove an overhead powerline and bury it along a similar alignment on private land in the southern portion of the Pandora area
- ◆ To facilitate intermediate access to the Loushin Traverse and the bottom terminal of the Pandora lift in several locations
- ◆ To facilitate return skier access from the top of the Pandora lift to the Sundek Restaurant

SUP/Operational Boundary Adjustments and Forest Plan Amendment

A Forest Plan amendment would be required to accommodate the proposed Pandora terrain area (ski trails) located outside of Aspen Mountain's existing SUP boundary that is currently designated as [Management Area 7.1 – Intermix](#). This ski terrain development would require that the [Forest Plan](#) be amended to incorporate these areas into the Aspen Mountain SUP boundary and would result in the conversion of approximately 22.5 acres of NFS lands currently designated as Management Area 7.1 to [Management Area 8.25 – Ski Areas \(Existing and Potential\)](#). To achieve a no net increase of the SUP area, an equal amount of lands currently within the SUP area and Management Area 8.25 would be removed from the SUP area and reallocated to Management Area 7.1. The location of the withdrawn area is depicted on **Figure 3**. The 22.5 acres of land currently within Aspen Mountain's SUP area that would be withdrawn possess similar ecological values to those lands proposed for inclusion in Aspen Mountain's SUP. In addition, ASC's Aspen Mountain Powder Tours SUP would also be modified to remove those acres that would overlap with the modified Aspen Mountain SUP area. Refer to **Appendix A** for additional detail regarding the Forest Plan amendment.

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Project Design Criteria

PDC would be applied to avoid and minimize potential resource impacts from construction and operation of the Proposed Action. These

PDC are identified in **Table 2-4**. This list supplements the list of BMPs that ASC will be required to prepare for Forest Service prior to the start of construction and implementation.

Table 2-4. Project Design Criteria

PROJECT PHASE	PROJECT DESIGN CRITERIA
General	<ol style="list-style-type: none"> 1) All proposed activities and facilities shall meet WRNF Forest Plan and all applicable agency management direction (e.g., Forest Service Handbook and Manual) for all affected resource areas. 2) All structures proposed on NFS lands shall be reviewed and authorized in accordance with the WRNF Facility Design Review Guide (2017). 3) Prior to starting construction activities on NFS lands, ASC shall develop a Construction Implementation Plan for Forest Service review and authorization. All proposed construction methodologies and practices will be reviewed for compliance with the decision and resource management direction. This plan shall include the following information: <ul style="list-style-type: none"> • <u>Construction Management</u>: Project timelines, project contracts, disturbance boundaries, grading and site plans, staging and parking areas, construction access, and any required survey information. • <u>Timber management</u>: Defined logging deck areas and skid paths, and protocol for timber removal. • <u>Erosion Control and Drainage Management</u>: Erosion control and drainage management activities. • <u>Post-Construction Revegetation and Restoration</u>: Methodology, locations, vegetative mixes, and soil amendments. • <u>Noxious Weed Management</u>: Weed control methodologies including equipment cleaning, pretreatment, and post-construction monitoring and treatment. • <u>Best Management Practices (BMPs)</u>: Resort BMP list to be employed and adhered to during project implementation. 4) ASC shall obtain all required county, town, and state permits prior to the start of construction.
Pre-Construction	<ol style="list-style-type: none"> 1) If tree cutting activities are proposed between March 1 and July 15, surveys for active migratory bird nests should be conducted by a qualified biologist prior to tree cutting. Trees with active nests and snags providing cavity nesting habitat should be retained when practicable, or as otherwise approved by the Forest Service Responsible Official. 2) Prior to any ground disturbing activities, project areas shall be surveyed for necessary Forest Service Region 2 sensitive species, including raptors and elk, in consultation with the Forest Service resource specialists. 3) Prior to any ground disturbing activities, a soil survey shall be completed. 4) All drainage improvements identified for Spar Gulch in the final Hydrology Report shall be included in a Drainage Management Plan to be prepared by a licensed professional engineer and reviewed by the Forest Service prior to authorization and construction.
During Construction	<ol style="list-style-type: none"> 1) If undocumented historic and/or prehistoric properties are located during ground disturbing activities or planning activities associated with approved construction activities, all construction in the immediate vicinity shall cease in accordance with 36 CFR § 800.11. 2) The Forest Service shall be contacted if Forest Service Region 2 sensitive plants are discovered within the project area during implementation.

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Table 2-4. Project Design Criteria (cont.)

PROJECT PHASE	PROJECT DESIGN CRITERIA
During Construction (cont.)	<p>3) To minimize the potential for increasing flows into Keno Gulch, and to address existing erosion within the Upper Spar Gulch watershed, ASC shall implement the following concurrent with the Summit Snowmaking Projects:</p> <ul style="list-style-type: none"> • Repair the eroded channel present on <i>Dipsy Doodle</i> and construct a sinuous riprap-lined channel • Where feasible, construct waterbars along existing ski trails within the Upper Spar Gulch watershed on areas of proposed snowmaking. Waterbars should discharge through adequate BMPs for erosion control and into well-vegetated areas. • Improve the roadside ditch that drains Summer Road near Pump House Hill and install rock check dams along the ditch to slow down flow velocities and minimize erosion within the ditch • Install grade controls along the channel of Spar Gulch between County Road 14 and the Summer Ditch diversion to prevent further erosion of the channel • Install BMPs for erosion control at the outlet of existing culverts along Spar Gulch, upstream from Summer Ditch • Install a splitter box on Spar Gulch just upstream from the diversion point with Summer Ditch, to support the maintenance of current runoff volumes diverted toward Keno Gulch <p>4) To reduce sediment loading in the Lower Spar Gulch watershed, ASC shall implement the following concurrent with the Summit Snowmaking Projects:</p> <ul style="list-style-type: none"> • Regrade, compact, and then line the channel of Spar Gulch below the confluence with Copper Gulch with riprap properly bedded (angular rock of adequate size is available on-site) • Install rock check dams along the channel of Spar Gulch at adequate spacing according to the channel slope • Improve the Spar Gulch trail surface adjacent to the channel. At a minimum, improvements should include construction of new waterbars and repairing existing waterbars to deflect surface runoff from the trail surface into the channel of Spar Gulch. Decommission and revegetate all or a portion of the 20-foot-wide Spar Gulch trail below <i>Kleenex Corner</i>. • Improve the four existing sediment traps adjacent to the Bell Mountain bottom terminal to maximize the amount of sediment that can be detained and reduce flow velocities downstream of these structures. <p>5) To manage surface runoff in Tributary #1 and Tributary #2 watersheds (refer to Figure 4), ASC shall implement the following concurrent with the Summit Snowmaking Projects:</p> <ul style="list-style-type: none"> • Improve the roadside ditch along the upper sections of County Road 14 and on Loushin Road that intercept snowmelt runoff originating from trails where new snowmaking coverage is proposed • Install relief culverts along roadside ditches at spacing adequate to the road gradient • Design and install adequate BMPs for erosion and sediment control on all road culverts and waterbars • Implement a BMP maintenance program to inspect, clean, and repair/replace BMPs for erosion and sediment control twice annually; as soon as snowmelt conditions allow and at the end of the summer before snow covers the ground • Where feasible, construct waterbars on existing trails where snowmaking is proposed. <p>6) To prevent additional runoff from <i>Buckhorn</i> from being delivered to the Castle Butte landslide, snowmaking pipeline alignment and drainage structures along <i>Buckhorn</i> shall be reviewed and authorized by the Forest Service prior to construction</p>

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Table 2-4. Project Design Criteria (cont.)

PROJECT PHASE	PROJECT DESIGN CRITERIA
During Construction (cont.)	<p>7) To prevent the fissure below the proposed Gent's Ridge Pond 2 from expanding and tearing the pond liner, the following measures shall be implemented:</p> <ul style="list-style-type: none"> • The upper 6 feet of the fissure will be over-excavated and the stony fissure fill replaced with poorly-graded aggregate. • The granular fill will be covered with a geotextile fabric with appropriate tensile strength. • The pond liner will contain an 18-inch, S-shaped overlap fold to allow it to unfold in the case of rapid horizontal extension of the fissure. <p>8) Prior to construction of the Gent's Ridge retention ponds, the Forest Service shall review geotechnical reports, design recommendations, dam hazard class analyses, and pond construction plans, all prepared by a licensed professional engineer.</p> <p>9) To allow ingress and egress of wildlife, snowmaking storage ponds shall be constructed with the following features:</p> <ul style="list-style-type: none"> • At least two banks with 5:1 side-slopes • If a liner is used, cover liner with at least 18 inches of topsoil <p>10) During construction, all food and garbage must be stored in bear-proof containers and hauled off site regularly, and employees and contractors shall not be allowed to have dogs on-site.</p>

2.2.2 Alternatives Considered but Eliminated from Detailed Analysis

The range of alternatives considered by the Responsible Official includes the Proposed Action analyzed in this document, as well as other alternatives eliminated from detailed analysis. The Forest Service Handbook states:

Alternatives not considered in detail may include, but are not limited to, those that fail to meet the purpose and need, are technologically infeasible or illegal, or would result in unreasonable environmental harm (FSH 1909.15).

No Action Alternative

The No Action Alternative provides a baseline for comparing the effects of the action alternatives. The No Action Alternative essentially reflects a continuation of existing management practices without changes, additions, or upgrades. No new facilities or recreational opportunities would be approved under the No Action Alternative. In accordance with Forest Service Handbook

1909.15, Chapter 40, Section 41.22, and 36 CFR § 220.7(b)(2)(ii) this EA will not include an analysis of the No Action Alternative, and it will not be discussed further. The Forest Service Handbook states:

A stand-alone no-action alternative is not required. However, the effect of taking no action should correlate closely with the purpose and need. In other words, the effects of not taking action should provide a compelling reason for taking action and, therefore, should be consistent with the purpose and need for action (FSH 1909.15).

As articulated in **Chapter 1**, the Purpose and Need is based on the lack of larger contiguous gladed areas that contain a variety of natural skiable features; intermediate glades; and traditionally cleared terrain that provides a more natural and secluded setting. In addition, there are circulation issues on the upper portion of the east side of the mountain that limit repeat use of the area and diminish guest experience. Finally, there is a lack of snowmaking

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infrastructure on the upper mountain, which reduces available terrain offerings during seasons with minimal early season snowfall. Without implementation of the Proposed Action, ASC would not be able to address these shortcomings. The No Action Alternative is not discussed further in this EA.

Original Proposed Action Alternative

The Proposed Action Alternative described in the NOPA included constructing a snowmaking storage pond near *Midnight* trail, instead of constructing the Gent's Ridge 3 pond as currently proposed. During preliminary engineering design, it was identified that the Midnight storage pond location did not contain suitable slopes for construction and greater than anticipated grading of the ground surface, as well as associated environmental impacts, would be required. As such, the Gent's Ridge 3 pond location was selected to replace the Midnight storage pond location. Removing the snowmaking storage pond near *Midnight* removed the ability for surface runoff in the Spar Gulch watershed to be directed to a snowmaking storage pond for later use; therefore, the use of the ponds for snowmaking runoff management within the Spar Gulch watershed was diminished.

The [NOPA](#) specified that construction access to the bottom terminal of the Pandora lift would occur using a new access road/ski trail (Trail P12). During field surveys, an existing and abandoned logging/mining road was identified within the Pandora terrain. It was determined that temporary use of this logging/mining road would create a more direct route to the bottom terminal location, allow Trail P12 to be constructed for pick-up truck access instead of large construction vehicle access, and shorten the distance for timber skidding. In addition, reclamation of the logging/mining road to original grade

and revegetation of the road would reduce existing bare ground.

The NOPA identified a total of 71 acres of largely contiguous gladed terrain to be developed in the southernmost portion of the Pandora area. During analysis, large natural openings were identified on aerial photography within this gladed area where tree clearing would not be required to provide gladed skiing acreage, thus lowering the amount of treated acres. In addition, large tree islands located between the proposed Pandora traditional ski trails were not included in the gladed terrain total yet were identified as potentially skiable if some tree removal occurs. In order to conduct a conservative analysis that better accounts for the total acreage where trees might be removed, the large tree islands have been included in the gladed terrain totals in the Proposed Action Alternative, increasing the total skiable gladed terrain from 71 acres to 101 acres. Because the large natural opening was not removed from the gladed terrain acreage totals, the actual number of acres of gladed terrain requiring tree removal would be less than 101 acres and would be identified during the timber sale process. In effect, the number of proposed treated acres and any correlated ground disturbance is similar to what was included in the NOPA.

Alternative with Mandatory Wildlife Seasonal Closures in the Pandora Area

An alternative was considered in which seasonal restrictions would be applied to the Pandora area between May 1 and July 15 for the protection of elk during calving season. These restrictions were considered for the construction, operation, and maintenance phases of the project. The Pandora area is located directly adjacent to areas mapped by the Colorado Parks and Wildlife (CPW) as elk

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production areas. To identify whether the Pandora area is used by elk, field pedestrian surveys were completed by a qualified biologist in early July 2018. Evidence of elk calving was not identified; as such, this alternative was eliminated from detailed analysis. A second season of field surveys is included as a PDC; should evidence of elk calving be identified during these later surveys, the operation plan may be amended to include a seasonal closure depending on field observations.

Alternatives Proposed by Public Commenters

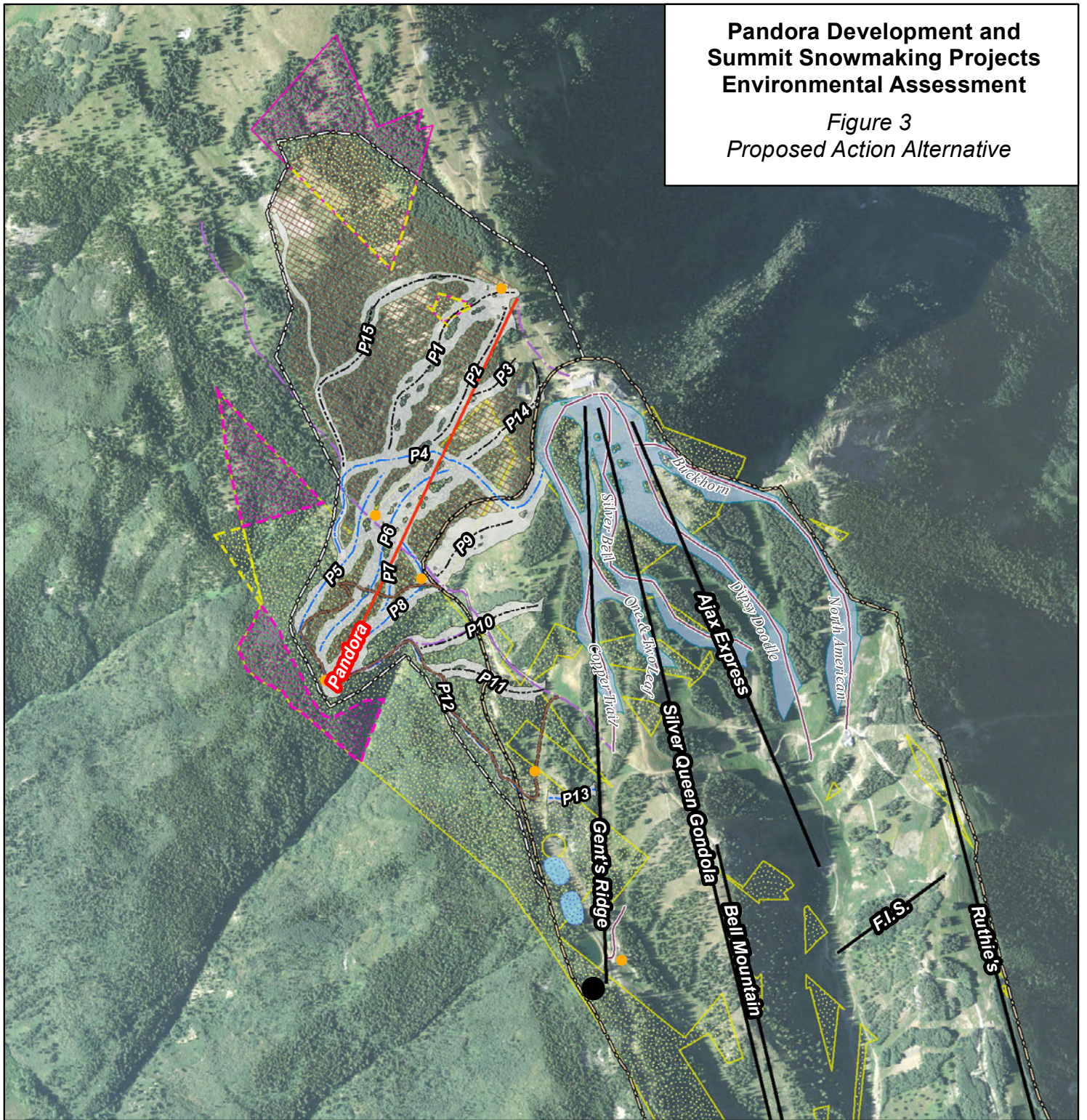
Various alternatives proposed by public commenters were considered but eliminated from detailed analysis. These include, but are not limited to the following:

- ◆ An alternative that only authorizes the Summit Snowmaking projects and does not include the Pandora terrain;
- ◆ An alternative that reduces the overall size of the Pandora terrain and does not include a lift;
- ◆ An alternative that reallocates the lands currently within the SUP area and Management Area 8.25 that would be removed from the SUP area, to Management Area 5.41 instead of Management Area 7.1; and
- ◆ An alternative eliminating all impacts to scenery from outside the ski area, particularly from the nearby North Star Nature Preserve.

These alternatives were eliminated from detailed analysis because they would fail to meet the Purpose and Need. For example, only authorizing the Summit Snowmaking projects would fail to meet the Purpose and Need for terrain variety and improved skier circulation. Constructing the Pandora terrain without a lift would not be operationally feasible, as the lift is necessary for skier circulation and to meet guest expectations. However, should the Responsible Official determine that the anticipated impacts from a component(s) of the Proposed Action are not justified, the Responsible Official may decide to remove the component(s) from the selected alternative identified in the Decision Notice, if appropriate. Further rationale for the elimination of these alternatives proposed by the public is provided in a Response to Comments document located on the project website and in the project file.

Pandora Development and Summit Snowmaking Projects Environmental Assessment

Figure 3
Proposed Action Alternative



Proposed Pandora Lift and Trails

- Chairlift
- Access Road
- Power Line
- Expert Ski Trail
- Intermediate Ski Trail
- Gladed Terrain
- Operational Boundary Adjustment
- Log Deck Sites

Proposed Summit Snowmaking Addition

- Pump Station
- Snowmaking Pipe
- Snowmaking Coverage
- Gent's Ridge Snowmaking Ponds

Proposed SUP Area Adjustment

- SUP Area Increase
- SUP Area Decrease

Existing

- Chairlift
- Operational Boundary
- SUP Area (MA 8.22)
- Non-SUP NFS Lands (MA 7.1)



0 1,000 2,000'

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AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Chapter 3. Affected Environment and Environmental Consequences

CEQ regulations direct agencies to succinctly describe the environment that may be affected by the alternatives under consideration ([40 CFR § 1502.15](#)). **Chapter 3** describes the existing environment for resources across the human and biological environments that have the potential to be affected by implementing either of the alternatives. Each Affected Environment description is followed by an Environmental Consequences discussion that provides an analysis of the potential effects of implementing the alternatives. *Direct effects* are caused by the action and occur at the same time and place. *Indirect effects* are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable (i.e., likely to occur within the duration of the project). *Cumulative effects* are the result of the incremental direct and indirect effects of any action when added to other past, present, and reasonably foreseeable future actions, and can result from individually minor but collectively significant actions taking place over a period of time.

This chapter is based on the issues identified in **Section 1.4**. Based on an understanding of the proposal, familiarity of the project area, and analysis of the issues raised in scoping, the line officer approved the following resources to be considered in detail in this analysis: recreation, scenery, cultural resources, soils, watershed, wildlife and fish, and air quality.

3.1 RECREATION

3.1.1 Affected Environment

The scope of this analysis extends to winter recreational opportunities at Aspen Mountain on NFS lands within the ski area's approximately 326-acre SUP boundary, and on adjacent private lands. Together with market demand and growing expectations of the public, the ski area has been continuously upgraded since winter operations commenced in 1938, enabling Aspen Mountain to provide its guests with a wide variety of ski terrain (e.g., developed ski trails, gladed tree skiing, etc.) throughout the SUP boundary. Summer use of the proposed trail network and snowmaking expansion is not included in the Proposed Action; therefore, summer recreation is not analyzed in this EA.

Pandora Backcountry Terrain

The current Pandora backcountry terrain is located off the eastern side of Richmond Ridge. Richmond Ridge extends from the summit of Aspen Mountain into the various Forest Service lands located to south. This land is within the general area of land commonly called "Richmond Hill." The Pandora area is a large, contiguous section of forest facing east towards NFS and other private undeveloped lands. It contains a variety of dense coniferous stands interspersed with aspen trees and natural mountain meadows. The area is secluded from the current Aspen Mountain trails with views of the forested lands to the east and not the City of Aspen, which dominates much of the views from Aspen Mountain's existing trail network. The Pandora area is currently outside of Aspen Mountain's SUP and operational boundary.

The Pandora area is currently "side-country," in that it can be accessed via a lift, but a lift cannot be used to repeat the terrain and

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skiers must hike out after descending. The area is accessed through three ways: 1) through the two backcountry gates that skiers can use after taking Aspen Mountain's Gent's Ridge or Ajax Express lifts or the Silver Queen Gondola; 2) self-transportation—including skinning, hiking, snowshoeing, and snowmobiling—up from the base of the Richmond Ridge; and 3) by use of the backcountry snow road that travels north along Richmond Ridge in the winter. Skiers and other users who descend the Pandora backcountry terrain who wish to repeat it must either hike/skin back to the ridgetop or use Aspen Mountain's existing lift system to return to the top. Utilizing Aspen Mountain's lift system to return to the top still requires a moderate hike back to the nearest lower lift terminal, Gent's Ridge lift. There are approximately 300+ acres of existing backcountry terrain adjacent to the existing operational boundary and accessible via the backcountry gate at Gent's Ridge lift. It is important to note that there is additional backcountry terrain in the vicinity; however, it is undetermined if members of the public regularly travel these extents.

Aspen Mountain currently estimates that anywhere from 0 to 100 people use the existing Pandora area per day. This includes snow cat operations, snowmobiles, backcountry skiers (accessed via backcountry gates on Aspen Mountain), people skinning up from the base of the Pandora area, hikers, school classes, and others. Aspen Mountain Powder Tours, which takes guests into the backside of Aspen Mountain to ski undeveloped terrain, also utilizes this area and operates under a separate SUP.

There are existing challenges presented within the current backcountry area. A variety of participants use the area, but because it is easily accessible from Aspen Mountain and other means of ingress, this can be problematic for those who use the area

wanting a more secluded skiing experience but without knowledge of the terrain or potential threats of backcountry skiing. Furthermore, due to the current backcountry nature of the terrain, ski patrol rescue access and egress paths are insufficient. Ski patrol responds to incidents beyond the current operational boundary but only patrol and enforce avalanche safety procedures inside the operational boundary. This means that current conditions require ski patrol to respond and assist those beyond the operational boundary without the pre-monitoring, patrolling, and lift-access assistance that is available within the ski area boundary.

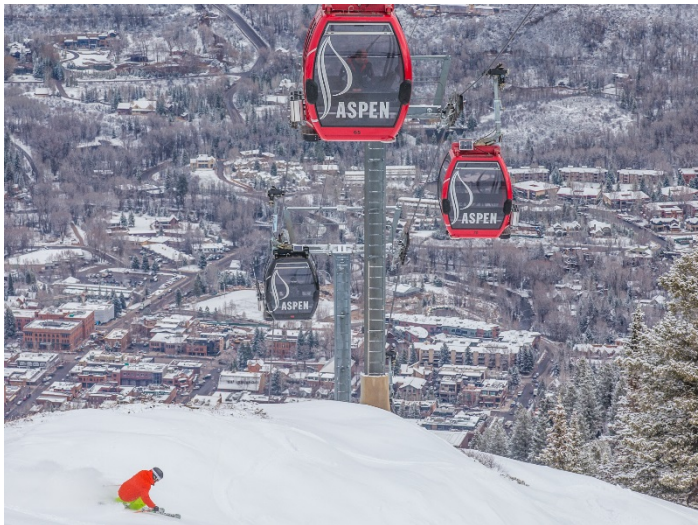
Aspen Terrain Network

The existing lift network at Aspen Mountain consists of one six-passenger detachable gondola, one detachable quad chairlift, one detachable triple chairlift, two fixed-group quad chairlifts, and three fixed-grip double chairlifts. The Silver Queen Gondola and the Shadow Mountain lift serve as the primary means for mountain access from the base in the City of Aspen.

Existing developed trails at Aspen Mountain utilize natural contours and fall-lines. An inventory of all skiable terrain reveals that there is a total of approximately 699 acres of formalized, lift-served skiable terrain at Aspen Mountain. This includes 475 acres of developed terrain—consisting of lift-accessed traditional, cleared, mostly groomable trails—and 224 acres of lift-accessed gladed and/or open but minimally maintained terrain. Aspen Mountain does not offer any specified beginner terrain and their ratio of traditionally cleared trails to undeveloped terrain within its operational boundary is relatively low compared to other ski areas on the WRNF.

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VIEW OF THE CITY OF ASPEN
FROM ASPEN MOUNTAIN'S
EXISTING TRAIL NETWORK

Aspen Mountain exists entirely below tree line; therefore, glades (both human-made and naturally occurring) are the only way it offers undeveloped terrain to its guests. The existing gladed terrain is primarily tree islands between traditionally cleared runs, which are typically less than 10 acres in size. These glades are accessible through a variety of Aspen Mountain's chairlifts, but they start and end with a cleared trail and do not allow for skiers to ski multiple gladed sections continuously. The existing glades also do not contain a variety of natural skiable features (such as rocks, cliff bands, gullies, and chutes) that advanced and expert skiers enjoy. In addition, the glades that are currently offered within the existing operational boundary are primarily advanced and expert terrain and there is very little intermediate gladed terrain. Furthermore, for both skiers who prefer gladed terrain and those who prefer developed terrain, the existing trail network lacks a more natural and secluded setting as the trails primarily face the other ski slopes and the City of Aspen.

The upper portion of the east side of Aspen Mountain is presently underutilized, due to the several areas of uphill or flat terrain that reduce guest experience. Trails on the upper

east side of Aspen Mountain currently offer quality expert terrain but terminate at *Lud's Lane* and require a short return hike if guests wish to repeat the terrain. This reduces repeat use of the area and shortens the skiable terrain.

In addition, in seasons with low early or late season snowfall, there is a lack of an effective connection from the upper section of the mountain to the lower slopes where the existing snowmaking infrastructure exists. The current snowmaking system covers a total of 172 acres of terrain and provides critical coverage on the mountain's lower slopes on elevations less than 10,600 feet. Above this elevation, Aspen Mountain currently relies on natural snow to provide adequate coverage. Currently, the Silver Queen Gondola is the primary uphill access from the base area and its top terminal is located on the upper mountain. In seasons with low snowfall and inadequate snow coverage, circulation issues can be caused through the heavy use of the Silver Queen Gondola to travel uphill and a lack of connecting trails downhill. Skiers must then take inefficient routes and different lifts to repeat terrain, causing increased traffic on certain trails and busier lift systems.

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3.1.2 Environmental Consequences of the Proposed Action

All changes to the quality of winter recreational opportunities within the SUP area would be performed with the goal of enhancing the recreation experience for Aspen Mountain and WRNF visitors. The Proposed Action would improve alpine skiing opportunities through the development of additional undeveloped, minimally maintained and traditionally cleared lift-served terrain within a natural and secluded setting. It would also improve circulation on the upper east side of Aspen Mountain. However, the Proposed Action would displace existing backcountry users, as described below. No multiple-use trails or other non-winter activities are proposed.

Snowmaking projects would also improve alpine skiing opportunities through improving the reliability and consistency of snow coverage on the upper mountain, allowing for top-to-bottom skiing, especially during the early and late parts of the season.

Pandora Backcountry Terrain

The Proposed Action would convert approximately 178 acres of terrain within the existing backcountry terrain to lift-served terrain within Aspen Mountain's SUP area. As the majority of the Pandora area is not currently within Aspen Mountain's existing operational boundary, an adjustment would be made to the operational boundary to incorporate the Proposed Action area. The portion of the Pandora area outside of the existing SUP would be incorporated into the SUP with the Forest Plan amendment.

The proposed Pandora chairlift would serve the proposed alpine skiing terrain. After accessing the project area via the Silver Queen Gondola, Gent's Ridge lift, or Ajax Express lift, the project area would be skied primarily by utilizing the Pandora lift. The

design (top-drive detachable quad) and capacity (2,000 pph) would facilitate easy and efficient loading and unloading for skiers accessing the Pandora area. Skiers would be able to repeatedly access the secluded gladed and traditional terrain offered by the Pandora area via this lift. In addition, the incorporation of the proposed Pandora area into the operational boundary would alleviate existing challenges associated for ski patrol response.

However, the proposed Pandora area would reflect a controlled and maintained skiing experience as is provided in other parts of Aspen Mountain's operational boundary and would no longer exist as backcountry. Therefore, the expansion of this terrain would have an impact on those who currently use the proposed Pandora and Richmond Ridge areas. Currently, skiers use the Pandora area from existing backcountry gates for skiing by using the ski resort lifts to ascend the mountain, skiing the Pandora area, and returning to the base area via access roads. Skiers also skin up the area under their own power and ski down. Furthermore, snowmobiles, cat skiing operations, hikers, and even school groups use the area. These participants' recreational experience would be negatively impacted by the increased skier density in the Pandora area (in the case of the backcountry users) and the complete inability to access the area (in the case of snowmobiles, cat skiing operations, and potentially school groups). It is important to note, however, that of the 72 acres of NFS lands within the Pandora area, approximately 56.3 acres are currently designated as Management Area 8.25 – Ski Areas (existing and potential), and are allocated by the Forest Plan for developed skiing.

The Comfortable Carrying Capacity (CCC), which is a planning tool that indicates the optimum level of daily utilization for a resort,

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of the Pandora lift and terrain is 620 people. That is, a comfortable usage amount in the Pandora area would be around 600 people, although actual numbers on any given day could be higher or much lower. Given the current usage estimates of between 0 and 100 people per day, this means a large increase in skier utilization is anticipated to occur from current conditions. Those seeking the current user density of the Pandora area would have to recreate farther south on Richmond Ridge. However, the proposed Pandora project would not encapsulate all the terrain currently used for backcountry, as the southern portion of the ridge would not be developed, and there would be one additional backcountry gate created to provide backcountry users with entry to this area. In addition, a public 'snow road' would be constructed annually around the Pandora top terminal location for wintertime public motorized access between Richmond Ridge and Midnight Mine Road. This road would allow for the operation of the proposed area while still providing continued public access to those lands historically permissible for winter travel south of the Aspen Mountain summit.

Even with these limitations on the expansion and efforts to address backcountry user interests, users would likely have to travel farther south on Richmond ridge and may be compressed into a smaller area of terrain, depending on the availability of suitable backcountry terrain. There also may be more conflicts as users start utilizing terrain that is used more frequently for snow cat operations, such as through Aspen Mountain Powder Tours, and snowmobile skiing. Particularly, the Aspen Mountain Powder Tours SUP area would decrease to remove the area of overlap with the Aspen Mountain SUP boundary adjustment in Pandora. Finally, while the Proposed Action would address some existing safety issues within the

area, similar issues may still exist farther south along Richmond Ridge under the proposed conditions. However, users simply looking for secluded terrain instead of the full backcountry experience may be satisfied by the proposed project area and the adequate ski patrol access that would be provided.

Aspen Terrain Network

The terrain network at Aspen Mountain would be improved to include trails and glades in the Pandora area. This would add approximately 178 acres to Aspen Mountain's skiable terrain, 55.5 of which would be located on NFS lands and 92.5 of which would be located on private lands. Approximately 101 acres of gladed trails and 77.5 acres of traditional trails would be developed. The gladed terrain would consist primarily of expert- and intermediate-level terrain while the traditional trails would provide a mixture of low-intermediate-, intermediate-, and expert-level terrain. The area would be accessible to intermediate skiers via trails like the *Copper Trail*.

The nature of the new terrain presents unique recreation opportunities at Aspen Mountain in a variety of ways. First, the current trail network exists in a heavily developed area and the secluded nature of the terrain is a desirable characteristic in the eyes of the public. The terrain would be skiable facing the undeveloped lands to the east of Aspen Mountain, giving guests a much more natural and secluded skiing experience than is currently available at the ski area. It would also allow skiers to recreate on a contiguous section of glades without having to access traditionally cleared trails. Second, the availability of naturally-skiable features like rocks, cliff bands, gullies, and chutes give skiers a wider variety of terrain to challenge themselves on. Third, the new terrain would provide the opportunity to develop

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intermediate level glades, which is a category of terrain not currently offered. To summarize, the terrain would offer guests an increase in variety from the existing terrain within Aspen Mountain, which is important considering that terrain variety is consistently ranked as the second-most important criterion in ski destinations.

The proposed chairlift would allow for skiers to re-access the Pandora area trails after utilizing them, and grading improvements would allow guests to ski on *Walsh's*, *Hyrup's*, and *Kristi's* without having to traverse a flat catwalk, and to access the Sundeck restaurant without having to traverse uphill. This would increase the ease of use of these trails as well as increasing ease of skier circulation throughout the upper eastern portion of Aspen Mountain.

The Proposed Action would also create the ability for snowmaking on the summit section of the existing network of trails on Aspen Mountain. As stated above, there is a need for snowmaking extending from the top-to-bottom of Aspen Mountain. The Proposed Action would allow snow to be made on the trails that connect the top terminal of the Silver Queen Gondola to the lower mountain intermediate trails. As most guests take the Silver Queen Gondola to reach the top of Aspen Mountain during the mid-winter season, having the ability to utilize the Silver Queen Gondola during the early and late seasons (because snowmaking allows trails to be skied) would improve guest recreational experience.

The snowmaking would also improve the experience of those who attend the World Cup Races in November by increasing the snow quality and reliability of coverage for those races. This would positively impact those who race in the event, and by extension, those who attend and watch the races.

3.1.3 Cumulative Effects

Past ski area and county development projects have been incorporated and analyzed in this document as part of the Affected Environment. The following projects could have cumulative impacts on recreation resources:

- ◆ 2018 Aspen Mountain Master Development Plan
- ◆ 2012 Aspen Area Community Plan
- ◆ Regional Ski Area/Recreational Amenities

Recreation within the Aspen Mountain SUP Area

Past projects have shaped recreational opportunities at Aspen Mountain, primarily bolstering the winter recreation opportunities available within the SUP area. The 2018 MDP includes numerous projects that are not included in the Proposed Action. As these projects were identified by Aspen Mountain and accepted by the Forest Service, they are considered here as reasonably foreseeable future projects. These projects include an update to the Ruthie's Restaurant building, redevelopment of the Buckhorn Cabin, and continued expansion and updating of the terrain and lift network. These projects, if approved and/or implemented, have the potential to further benefit recreation within the Aspen Mountain SUP area.

In combination with previously accepted and approved projects that are reasonably foreseeable, and past projects that have been implemented at Aspen Mountain, the proposed projects would supplement existing winter recreation opportunities by providing additional ski terrain and infrastructure that would address existing deficits of secluded, gladed and non-gladed terrain for intermediate and expert skiers at Aspen Mountain. It is anticipated that when combined with the recreation opportunities provided by past projects, the Proposed

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Action would have a combined beneficial impact on the recreation resource within the existing SUP area.

Recreation Opportunities beyond the Aspen Mountain SUP Area

Beyond Aspen Mountain and in the broader context of the City of Aspen, opportunities for recreational activities are abundant on both private and public lands, including NFS, Pitkin County, and other municipal lands. Visitors of NFS lands outside of the Aspen Mountain SUP area are also increasing due to population growth, the natural resources present, and an array of dispersed activities that exist in the area. Ongoing projects and visitor management show that this trend is occurring independent of additional recreation being provided at Aspen Mountain. While ongoing projects and visitor management work to mitigate the impacts that fall disproportionately on high use destinations and balance resource impacts with recreational opportunities, it is anticipated that additional visitors to the area could create future challenges for management and mitigation of impacts to high use destinations. In some cases, the additional recreation opportunities within the Aspen Mountain SUP area may alleviate pressure on high use destinations by providing alternative opportunities for recreation in a location that is easier to manage due to its developed nature and existing infrastructure. In others, the continued increase in visitation and expansion at Aspen Mountain could increase the number of conflicts with those who use the lands just outside the SUP area. When considered cumulatively with the growing visitation to the greater Aspen Mountain area, it is anticipated that pressure on high use destinations would increase.

Cumulatively, the proposed projects at Aspen Mountain could lead to an increase in use of recreation opportunities on NFS lands and

municipally owned lands within Pitkin County. Given the scale of the proposed projects, this increase is expected to be negligible; however, it is likely that the Forest Service and local governments and organizations would continue to allocate resources to expand recreational offerings and address the management of exiting recreation opportunities in the foreseeable future.

3.2 SCENERY

3.2.1 Affected Environment

Analysis of the aesthetic environment requires an evaluation of the project area and its ability to absorb the effects of both historic and ongoing human-induced and natural changes. Slope, natural vegetation types and patterns, topography, and viewing distance are important factors in this analysis. The aesthetic impacts of the proposed changes within the project area are considered in relation to the overall existing development/recreational theme of Aspen Mountain. The scenic environment on NFS lands is directed by the [Forest Plan](#), the [Scenery Management System](#) (SMS), and the [Built Environment Image Guide](#) (BEIG).

Aspen Mountain SUP and Surrounding Area

The Aspen Mountain SUP area is unusual in that it is composed of noncontiguous parcels situated in and around private land. In addition to operations on NFS lands, the base area and lowest slopes of Aspen Mountain are located within the City of Aspen. Since 1938, when the area began operating as a developed ski area, Aspen Mountain has developed a variety of ski area infrastructure, including lift and trail networks, guest service facilities, and other infrastructure (refer to **Section 3.1** for a description of existing recreation opportunities). This development of skiable

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terrain and associated infrastructure has required tree clearing in densely forested areas and has visually altered the natural patterns of the forest character over time.

Thus, recreation contributes heavily to the sense of place and scenery at Aspen Mountain. The WRNF recognizes the contribution of recreation to the scenic integrity of Aspen Mountain by officially designating Management Area 8.25 – Ski Areas (Existing and Potential) and the Aspen Mountain SUP area with Scenic Integrity Objectives (SIOs) of Low (“appears moderately altered”) and Very Low (“appears heavily altered”). The portions of Management Area 7.1 – Intermix that would be converted to Management Area 8.25 under the Proposed Action are designated as Low (USDA Forest Service 2002).

The topography of Aspen Mountain and nearby NFS lands not currently in the SUP is characterized by a series of ridges and subridges with steep slopes. Elevations range between approximately 7,900 feet above mean sea level (amsl) in the base area to 11,200 feet amsl at the summit. Notably, all of Aspen Mountain’s ski terrain lies completely below tree line and there are no open bowls or rocky alpine features. The majority of skiing terrain faces north and is, therefore, visible in the middleground distance zone from the City of Aspen and, to a lesser degree, the surrounding lands to the east and west. In turn, the City of Aspen is a prominent feature in the middleground from the majority of Aspen Mountain’s terrain. Vegetation cover throughout the area varies due to the range in elevation, slope aspect, and gradient. Dominant species include



“THE CITY OF ASPEN IS A PROMINENT FEATURE FROM THE MAJORITY OF ASPEN MOUNTAIN’S TERRAIN

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Douglas fir, lodgepole pine, Engelmann spruce, sub-alpine fir, and aspen. The distinctive vegetation patterns typical of cut ski slopes contribute to the scenic character of Aspen Mountain.

Aspen Mountain's architectural character is varied and includes elements of rustic Rocky Mountain vernacular in structures that use wood siding, large timbers, and stone. Facilities related to lift infrastructure are generally of standard design and dark colors. Some existing hospitality, sanitation, maintenance, and safety facilities lack a consistent and unifying architectural character. This is typical of most ski areas in the region where architectural styles have changed throughout the years resulting in a lack of unity or consistent, recognizable image.

Project Area

Summit Snowmaking Area

The Summit Snowmaking area of Aspen Mountain is within the existing trail network and is clearly visible in the foreground as viewed from the top terminals of the Gent's Ridge lift and Ajax Express lift, as well as the Silver Queen Gondola. As this area is within the existing trail network, the scenic characteristics of the area are that of a ski area, including cut ski trails, chairlifts, and

other various ski area maintenance infrastructure. In particular, line and color have been modified by the introduction of linear ski trails and chairlifts and by the alteration of vegetation communities within ski trails (grasses and forbs) and existing forests (conifers and aspens). The Summit Snowmaking area is designated with SIOs of Low and Very Low.

Pandora Area

The Pandora area begins on the top of Richmond Ridge, the ridgeline that runs south from the summit of Aspen Mountain, and extends down the eastern side of the ridge towards Top of the Rockies National Scenic Byway (Highway 82) and the base of the valley. The area is hidden from view from the City of Aspen itself but visible in the middleground from the Highway 82, North Star Nature Preserve, and adjacent NFS lands. The Pandora area becomes less visible as viewers travel east along Highway 82, eventually becoming indiscernible in the background from such viewpoints as the summit of Independence Pass.



NORTH STAR
NATURE PRESERVE
LOOKING TOWARD
PANDORA AREA

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The area of the Pandora lift top terminal on private lands already has the scenic characteristics of a developed recreation area because of its close proximity to existing infrastructure, including the Sundeck Restaurant and top terminals of Gent's Ridge lift and Silver Queen Gondola. The view from the east-facing slopes of the Pandora area—where the Pandora glades and traditional trails are proposed—are mostly native forest, characterized by meadows interspersed with forests and tree islands of aspens.

The Pandora area is designated with SIOs of Low and Very Low.

3.2.2 Environmental Consequences of the Proposed Action

Aspen Mountain SUP Area and the Surrounding Area

Implementation of the Proposed Action would incrementally contribute to the developed character of the Aspen Mountain SUP area, which is identified in the Forest Plan as Management Area 8.25 – Ski Areas (Existing and Potential). As stated previously, the Forest Plan recognizes the contribution of recreation to the scenic integrity of Aspen Mountain by officially designating Management Area 8.25 – Ski Areas (Existing and Potential) and the Aspen Mountain SUP area with SIOs of Low and Very Low. With adherence to management requirements, none of the proposed projects are expected to increase scenery impacts to the character of the SUP area, such that it would not meet the SIOs of Low and Very Low, as designated.

The proposed projects, particularly the Pandora development, could alter the scenic characteristics of the Aspen Mountain SUP area as viewed from the adjacent NFS lands, North Star Nature Preserve, and Highway 82. In particular, development of the Pandora area would add linear features (Pandora lift and traditionally cleared trails) within the

middleground distance zone when viewed from North Star Nature Preserve and Highway 82. Through tree clearing and the subsequent growth of grasses and forbs in the place of trees, color and form of vegetation would be altered. Glading would thin the tree islands, increasing the visibility of the forest floor through the tree canopy. While discernible year-round, this contrast would be greatest in winter, when the contrast between the snow-covered ground and dark green conifer stands is most prominent. Users of Highway 82 would considerably decrease during winter due to the annual seasonal closure that occurs between the beginning of November and the end of May; however, cross-country skiers and pedestrians would still use the highway and these users would observe the Pandora development.

Still, the Proposed Action would constitute a natural extension of visual character equal to that of adjacent existing ski area development, which would reduce the overall scenery impact in the context of the Aspen Mountain SUP area and adjacent lands. In addition, when viewing Aspen Mountain and the surrounding area generally, existing infrastructure and ski trails are clearly visible and the proposed developments would not be occurring in an area with an undisturbed viewshed.

As described previously, the SIOs of the project area are a mixture of Low and Very Low, including the areas that would be converted from Management Area 8.25 – Ski Areas (Existing and Potential) to Management Area 7.1 – Intermix. Though introducing scenic impacts in previously undeveloped areas, it is unlikely that any projects would alter the scenic characteristics of Aspen Mountain's SUP area and nearby land as viewed from the middleground and background distance zones. Constituents of the WRNF expect and value high quality

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scenery as an important element of their experience on the Forest; however, Aspen Mountain has developed into a concentrated year-round resort and it is reasonable to assume that most viewers expect areas within the SUP and private lands to appear as such.

Project Area

Due to their differing existing condition, the Proposed Action would have distinct effects on the Summit Snowmaking area versus the Pandora area.

Summit Snowmaking Area

The Summit Snowmaking project would result in the increase of ski area infrastructure to the area, including the construction of a pump station, two new storage ponds, and various pipeline infrastructure. The pipeline infrastructure would be buried within existing ski trails and the land would be revegetated; therefore, this impact is considered temporary. Snowmaking guns would be visible along trail edges but visually consistent with existing development. The pump station would be designed to blend in with the environment and would meet the intent of the BEIG, while the storage ponds would utilize the natural topography of the land and screening by taller trees and shrubs to lessen their scenic impact. Form, line, and color would remain similar to existing conditions and the Summit Snowmaking area would continue to meet the SIO of Low and Very Low, as designated.

Pandora Area

The installation of the Pandora lift and creation of 180 additional acres of ski trails, including 79 acres of traditional trails and 101 acres of gladed trails, would alter the scenic characteristic of the Pandora area. Recreationists that currently use the Pandora area backcountry for skiing, snowmobiling, and other sports would experience foreground impacts on their viewshed as

land that is currently undeveloped would be developed into ski trails. Users of Aspen Mountain, however, would experience an improvement in their view as they transition from the trails that primarily face the City of Aspen to ones that primarily face undeveloped, more natural land. Restoration of the existing abandoned logging/mining road following construction of the Pandora area would constitute an improvement to the Pandora area.

The Proposed Action itself would alter the scenic characteristics of the area through the following: vegetation clearing and land grading associated with construction of the chairlift corridor and the top and bottom terminals; tree and forb cutting for the development of the ski trails; and similar forest disturbance for the creation of the access road. These items would all impact the scenic resources within the project area and would constitute a change from existing conditions; however, each specific project component would be in conformance with the Forest Plan, minimizing its scenery impacts as described in the following paragraphs.

Construction of the chairlift would require a corridor of variable width to be cleared through the forest canopy. The chairlift corridor would minimize the negative visual effect of a straight corridor by creating larger openings in key locations to better visually blend into the surrounding landscape. The proposed lift terminals would require clearing of the forest and grading of the land but would be designed to blend with the environment and would meet the intent of the BEIG. Prior to construction, all proposed facilities, including lift infrastructure, would undergo Forest Service review to ensure compliance with the BEIG. In addition, the Pandora lift top terminal location has been selected specifically to retain vegetative screening and the lower terminal would have an approximately 25-foot-wide vegetative

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buffer maintained behind and below it to visually screen it from the valley below.

Development of the ski trails would require the cutting of trees and other vegetation; however, traditional trail development would utilize natural openings and glades to the extent practicable. Proposed skiways would have curves and feathered edges to reduce scenic impacts. The trails would include interspersed tree clusters to lessen impacts on the area's scenic character. Additionally, much of the proposed terrain would resemble natural glades rather than clear cut ski runs, with 30 to 40 percent of tree basal area being cleared from gladed areas. In addition, some areas are naturally gladed and would require little tree removal. While traditional ski trails may appear as white stripes against the dark forest background, glades are less visible in the landscape and only increase the visible white space an incremental amount. The shape of new openings and ski runs in the forest canopy would be structured to appear natural and blend into the surrounding vegetation.

Finally, the construction and maintenance of the Pandora expansion would be accomplished using existing access roads and one proposed new road. This would introduce a linear feature and require the removal and disturbance of vegetation color and patterns, which could also impact the area's scenic characteristics.

Considering these impacts and with implementation of PDC identified during design review, the proposed Pandora development is not expected to increase scenery impacts to the character of the SUP area, such that it would not meet the SIO of Low and Very Low, as designated.

3.2.3 Cumulative Effects

In combination with previously analyzed and approved and/or unimplemented projects

that are reasonably foreseeable, and past projects that have been implemented at Aspen Mountain, the proposed projects would contribute incrementally to the modified nature of the area and could further detract from the natural character of visual resources as viewed from within the Aspen Mountain SUP area and adjacent NFS and private lands.

Aspen Mountain has been upgraded and expanded since its inception as a ski area, adding chairlifts, new and improved ski terrain, snowmaking, parking, and lodge facilities. In addition, the 2018 MDP includes numerous projects that are not included in the Proposed Action, including a new Patrol Headquarters Building, more mountain biking and hiking trails, and expansion/remodeling of Buckhorn Cabin. As these projects were identified by Aspen Mountain and accepted by the Forest Service, they are considered here as reasonably foreseeable future projects.

When considered cumulatively with the projects analyzed in this EA, these previously-implemented projects have the potential to affect the scenic integrity of the Aspen Mountain SUP area. Changes in vegetative pattern and the construction of developed facilities are visible from private and NFS lands within and surrounding the SUP area.

Ongoing projects show that changes to the visual attributes of the surrounding areas are occurring independently from additional projects implemented at Aspen Mountain. The Aspen Mountain SUP is within Management Area – 8.25 Ski Areas (Existing and Potential). There has been development across the WRNF within areas designated as Management Area – 8.25; however, the proposed project and other cumulative actions are a relatively small portion of the WRNF, and other portions of the Forest would continue to be managed to provide and

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protect other uses such as habitat, dispersed recreation, and forest goods. As discussed above, the Forest Plan includes mechanisms for the management of scenic resources Forest-wide. While the Forest Plan includes numerous management prescriptions that could impact scenic resources across the Forest, the application of Forest Plan standards and guidelines would ensure that scenic quality is maintained or improved.

3.3 CULTURAL

This cultural resource assessment is mandated by the National Historic Preservation Act (NHPA). Section 106 of the NHPA requires that federal agencies take into account the effects of a federal undertaking on any cultural resource that is included in or eligible for inclusion in the National Register of Historic Places (NRHP). NRHP eligibility is evaluated for its integrity of the resource, its significance in the historical context, or its overall value in terms of engineering, artistic, architectural, or informational. The WRNF determines the impact to the cultural resources based on the resource's NRHP eligibility and then requests concurrence by State Historic Preservation Officer on that impact.

Metcalf Archaeological Consultants (Metcalf) prepared the *Class III Cultural Resources Inventory of the 2018 Proposed Aspen Pandora Lift at Aspen Ski Resort in Pitkin County, Colorado, USFS Report Number R2018021500030*, which is summarized in this analysis and contained in the project file (Metcalf 2018).

3.3.1 Affected Environment

A Class I archaeological inventory for the project area was completed in August 2018. This literature search utilized the Colorado Office of Archaeology and Historic Preservation sites and survey records (Compass), the WRNF cultural resource atlas,

relevant cultural resource management reports, and General Land Office plat maps. A total of four previously recorded sites were identified. These previously recorded resources include the Tourtellotte mining town (5PT486), The Sundeck Restaurant (5PT497), Richmond Hill paleontological locality (5PT693), and a ski run known as Ruthie's Run (5PT693).

A Class III pedestrian survey totaling 231 acres was also conducted for the above sites as well as previously unidentified sites in August and September 2018. None of the previously recorded sites have intact materials in the project area. The Town of Tourtellotte is no longer evident, the original Sundeck Restaurant was replaced by the newly constructed Sundeck restaurant facility, and no paleontological items were found in the Richmond Hill vicinity. Due to the lack of evidence or intact cultural materials, these three previously recorded sites are not included in the inventory. *Ruthie's Run* was originally recorded in general terms and location with no evaluation recommendations. Analysis suggests that the ski run has altered its course multiple times and the original edges of the historic run are impossible to identify due to construction around the area. It is therefore recommended as unevaluated for the NRHP and no further work is suggested.

Newly recorded resources include 18 isolated finds, 12 sites, and 7 linear site segments. The isolated finds include prospect pits and artifact scatters. Newly recorded site types are dominated by areas associated with mining activity locations, especially within Tourtellotte Park. Ten sites exhibit mining activity, while one is a probable small mining camp. These mining sites typically include various features like prospect pits, shafts, adits (mine tunnels), leveled earth platforms, and associated roads. One site is a historic debris dump likely associated with later ski

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development. None of the newly recorded isolated finds or sites are recommended eligible for the NRHP.

Of the seven linear site segments, one is an unnamed road segment with associated mining activity, four are road segments identified on archival maps, and two are vestiges of the original Ski Lift No. 1 chairlift. These newly recorded linear site segments are recommended as non-supporting elements of the potential NRHP eligibility of the entire linear resources.

3.3.2 Environmental Consequences of the Proposed Action

The Proposed Action includes snowmaking, ski trail and lift line development, lift terminal construction and ground grading, construction or maintenance of new roads, and tree removal and are considered a ground-disturbing activity. Impacts to cultural resources from these activities include the potential alteration or destruction of artifacts or cultural features on the surface, as well as damage to site soil matrices and depositional strata. There is also potential for ground disturbance in the form of vehicles, personnel, and other equipment used to implement the Proposed Action. These forms of disturbance could alter surface cultural resources, shallow subsurface cultural resources, or even resources as deep as 5 feet below the ground surface.

During the Class III cultural resource inventory, 37 sites of various sources were identified. The sites were either not recommended eligible for the NRHP or were non-supporting elements of the eligibility. A recommendation of *no adverse effect* to historic properties was made. No further work or site avoidance was recommended. No active cultural resource monitoring or changes in the design of the undertaking are necessary for the protection of historic properties. The Forest Service is in the process of consulting with the State Historic Preservation Office (SHPO) on this determination.

If any cultural resources are identified during project implementation, procedures described by the NHPA, Native American Grave Protection and Repatriation Act (NAGPRA), and the WRNF will be followed to ensure adequate protection of the discovered resource. A PDC is included in **Table 2-4** that requires ceasing work in the immediate area of the find until the relevant official is notified, the site is inspected by said official, and approval of continuation is given.

3.3.3 Cumulative Effects

The Proposed Action, when combined with other past, present, and reasonably foreseeable future actions at Aspen Mountain (including the 2018 Aspen Master Development Plan), could alter the cultural resources within the project area. However, since the implementation of the projects within the Proposed Action was determined to have no effect on known NRHP listed or eligible historic properties, no cumulative impacts to cultural resources are possible.

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3.4 GEOLOGY AND SOILS

3.4.1 Relevant Management Direction

The Forest Plan and Watershed Conservation Practices Handbook (WCPH) provide direction for soil management and slope stability.

Forest Plan Standards and Guidelines

Forest-wide

- ◆ Standard 5 – Manage land treatments to maintain or improve soil quality, limiting the sum of detrimental soil impacts to no more than 15 percent of an activity area
- ◆ Guideline 1 – Conduct an onsite slope stability exam in areas identified as potentially unstable. Potentially unstable land is described as having a “high” or “very high” instability ranking or classified as “unstable” or “marginally unstable.” Limit intensive ground-disturbing activities on unstable slopes identified during examinations
- ◆ Guideline 3 – When logging over snow, conditions should allow for 1 foot of packed snow to be continuous (i.e., not patchy) and competent enough so that wheeled or tracked vehicles do not break through. When logging over frozen ground, a minimum of 3 inches of continuous frozen ground should be present
- ◆ Guideline 4 – To minimize soil impacts, the following practices should be followed for vegetation management activities:
 - Use practices other than brush rake pilling and crushing by heavy equipment to dispose of slash
 - Limit the width of skid trails to 12 feet and spacing between trails to no closer than 120 feet on average

- Limit heaving equipment such as feller-bunchers to 3 round trip passes on designated skid trails
- Utilize low p.s.i. (less than 7 p.s.i.) tracked equipment when available

Management Area 8.25

- ◆ Soil Standard 1 – Effective ground cover (mulch) upon completion of ground disturbing activities will meet minimum levels of pre-treatment habitat type
- ◆ Soil Guideline 1 – Ground cover, as a combination of revegetation and mulch applications, should meet the requirements in the table below, one and two years following completion of ground disturbing activities (refer to Forest Plan for referenced table)
- ◆ Water and Aquatic Standard 3 – Snow management, including snowmaking and snow-farming, will be conducted in a manner that prevents slope failures and gully erosion, as well as bank erosion and sediment damage in receiving channels

WCPH Management Measures

- ◆ MM-11 – Stabilize and maintain roads and other disturbed sites during and after construction to control erosion
- ◆ MM 12 – Reclaim roads and other disturbed sites when use ends, as needed, to prevent resource damage
- ◆ MM 14 – Maintain or improve long-term levels of organic matter and nutrients on all lands

3.4.2 Affected Environment

Geology

Aspen Mountain is located between the crystalline rock-cored Sawatch Uplift to the east and sedimentary rock-filled Eagle Basin to the west. The border between these two terranes is formed by the Castle Creek fault

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zone. Due to its location adjacent to this fault zone, the geology of Aspen Mountain is much more complex than that of the other three Aspen ski areas (Geo-Haz 2010). In addition, an extensive system of mining tunnels, inclines, shafts, and stopes underlies Aspen Mountain (Geo-Haz 1997). These mines date to the late 1800s and targeted the Leadville Limestone and associated silver deposits. The lack of surface indications of groundwater (e.g., perennial streams or springs) combined with the deep mine system, abundant geologic faulting, and short distance to the Roaring Fork River and Castle Creek contribute to the apparent lack of groundwater on Aspen Mountain (Bryant 1972).

Due to the bedrock geologic units and faulting within and adjacent to the Aspen Mountain SUP area, there have been numerous past incidents of slope instability, such as erosion and slope failure, as well as deep-seated gravitational spreading (DSGS), expressed as the creation of fissures and the vertical movement of one piece of land relative to another (Geo-Haz 2010). Field observations and analysis of published maps and reports have identified DSGS in the area of the Pandora lift and trails as well as the Gent's Ridge Pond 2 location. In addition, the large Castle Butte landslide is located downgradient of *Buckhorn*, and two recent (1996) debris flows have occurred in Keno Gulch.

Keno Gulch is located on the west side of Aspen Mountain in the Castle Creek drainage and receives water from the project area via Spar Gulch and Summer Ditch (refer to **Figure 4**). The debris flows were triggered by snowmelt during a rapid warming trend,

descending approximately 1,200 feet to the mouth of Keno Gulch at Castle Creek and severely damaging facilities and vehicles at the Music Association of Aspen/Aspen Country Day School campus (USGS 1997). A 1997 USGS study identified a direct causal relationship between the landslide movement/debris flows and spring snowmelt (USGS 1997).

The WRNF Stability Model has identified the stability risk of soil that overlap the proposed projects as between *slight* to *moderately high* (refer to **Figure 5**).

Soils

The analysis area for soil resources is the Aspen Mountain SUP area, as it is proposed to be adjusted. This analysis is based on a review of the Holy Cross Area Soil Survey, Aspen-Gypsum Area Soil Survey, Natural Resources Conservation Service (NRCS) Web Soil Survey, and the WRNF Soils Dictionary. No site-specific soil surveys were completed for this analysis but would be required prior to implementation of any approved projects to ensure consistency with the Forest Plan standards and guidelines as determined by the Forest Service Soil Scientist or their representative.

There are 12 soil map units within the SUP area (refer to **Figure 6**). These soils are developed from colluvium, residuum, and till on nearly level to very steep mountain slopes, as well as mountain sideslopes with landslides. The acreages of each of these map units within the SUP area and their corresponding whole soil erosion factor (Kw) and erosion hazard rating are listed in **Table 3.4-1**.

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Table 3.4-1. Soils within Aspen Mountain SUP Area

SOIL MAP UNIT NUMBER	SOIL MAP UNIT NAME	ACRES IN SUP AREA*	PERCENT OF SUP AREA*	WHOLE SOIL EROSION FACTOR (KW)	EROSION HAZARD RATING
346C	Gateview-Handran-Eyre families complex, 40–65% slopes	0.3	0	Gateview: 0.15 Handran: 0.10 Eyre: 0.15	Gateview: Severe Handran: Severe Eyre: Severe
351C	Scout family, 40–65% slopes	56.4	17	Scout: 0.08	Scout: Severe
381B	Seitz-Scout families complex, 5–40% slopes	50.6	16	Seitz: 0.15 Scout: 0.08	Seitz: Moderate Scout: Moderate
604C	Leighcan family, 40–60% slopes	69.1	21	Leighcan: 0.15	Leighcan: Severe
604D	Leighcan family – Rock outcrop complex, 40–150% slopes	5.0	2	Leighcan: 0.15	Leighcan: Severe
650B	Leighcan-Leighcan families, moderately deep complex, 5–40% slopes	39.6	12	Leighcan: 0.15	Leighcan: Moderate
654D	Tolby family – Rock outcrop – Hiwan family complex, 40–150% slopes	37.9	12	Tolby: 0.15 Hiwan: 0.10	Tolby: Severe Hiwan: Severe
670C	Leighcan-Tolby families complex, 40–65% slopes	36.5	11	Leighcan: 0.15 Tolby: 0.15	Leighcan: Severe Tolby: Severe
9	Ansel-Anvik association, 25–45% slopes	12	4	Ansel-Anvik: 0.32	Ansel-Anvik: Severe
11	Anvik-Skylick-Sligting association, 25–50% slopes	1.2	0	Anvik-Skylick-Sligting: 0.24	Anvik-Skylick-Sligting: Severe
77	Mine loam, 25–65% slopes	12	4	Mine loam: 0.24	Mine loam: Severe
Not Mapped		4.3	1	N/A	N/A
Total		324.9	100	N/A	N/A

Source: USDA Forest Service 1998

Notes:

* SUP area as it is proposed to be adjusted

Totals may not match due to rounding

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Erosion potential can vary widely among soil units within a given area and is dependent on the particle size distribution of the soil, the slopes on which it is found, and the amount and type of vegetative cover. A soil's Kw factor indicates the general susceptibility of soil to sheet and rill erosion. The value of Kw ranges from 0.02 to 0.69. The higher the Kw value of a soil type, the more susceptible the soil type is to sheet and rill erosion. Erosion hazards become critical issues when protective vegetation is removed from the soil surface. Typically, soils found on steeper slopes have a higher erosion hazard than those on gentler slopes. Soils with more fine particles are at greater risk of wind erosion, and soils with more gravel and/or stones have a lower risk of wind erosion. The value of Kw for soils within the SUP area ranges from 0.08 to 0.32 (refer to **Table 3.4-1**).

Erosion hazard is an interpretive rating based on soil erosion factor K, slope, and content of rock fragments. A rating of *slight* indicates that little or no erosion is likely; *moderate* indicates that some erosion is likely, that roads or trails may require occasional maintenance, and that simple erosion-control measures are needed; and *severe* indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed. The erosion hazard rating for soils within the SUP area ranges from *moderate* to *severe*.

3.4.3 Environmental Consequences of the Proposed Action

Geology

Pandora Lift and Trails

The development of the Pandora trails and lift could be impacted by DSGS through slow shifting of the lift terminal locations; however, given maximum extension rates, the expected shifting of the Pandora lift bottom

terminal would be within the engineering performance envelope of a typical chairlift and would not constitute a constraint. As ski area operations have not been documented to impact DSGS processes, the proposed trail clearing and lift construction would not have any negative impact on the geologic environment (Geo-Haz 2010).

Construction of the access road would be more geologically "invasive" because of the extensive cuts and fills required for its development; however, as the access road would not cross any areas of known slope instability and would be aligned with structurally secure slopes, the construction of the road would not be anticipated to cause any new instability nor would it be expected to be damaged by ongoing slope instability.

Summit Snowmaking

The additional snowmaking included as part of the Proposed Action would increase water yields across the project area watersheds, with increases ranging from 11 percent to 21 percent. This increased runoff could impact the slope stability of the nearby landmasses; however, approximately half of the proposed snowmaking area does not have a history of prior slope instability and it is not anticipated that the increased water would create any stability problems in these areas.

Without application of PDC included in **Table 2-4**, increased runoff from proposed snowmaking on *Buckhorn* and increased runoff that enters upper Spar Gulch could result in increased slope instability. Runoff from the proposed *Buckhorn* snowmaking could flow towards the Castle Butte landslide, which is currently stable but could become prone to sliding again if sufficient additional water were added to the landmass. To address this, a PDC has been incorporated into **Table 2-4** to divert runoff to the northeast so no additional water is delivered to the Castle Butte landslide.

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Under the Proposed Action, approximately 29.7 acres of the proposed 53 acres of snowmaking would be applied to trails that drain to upper Spar Gulch, which is intercepted by Summer Ditch and discharges to Keno Gulch (**Figure 4**). The applied snowmaking would result in an increase in modeled water yield of 23.3 acre-feet in the upper Spar Gulch watershed, or 11 percent above the existing condition (refer to **Table 3.5-3** in **Section 3.5**). To address the history of slope failure in Keno Gulch, discharge into the Summer Ditch should be kept at or below the current value. To allow the amount of runoff flowing toward Summer Ditch and therefore Keno Gulch to be regulated, the Proposed Action would include installation of a splitter box on Spar Gulch immediately upstream of the Summer Ditch diversion (refer to **Table 2-4**). PDC have also been developed to reduce runoff velocities in the Upper Spar Gulch watershed and provide opportunities for infiltration of snowmelt (refer to **Table 2-4**). Implementation of the Proposed Action along with the identified PDC would eliminate any additional water entering Keno Gulch through the Summer Ditch associated with the proposed snowmaking (refer to **Table 3.5-5** in **Section 3.5**); however, runoff entering Keno Gulch would not be completely eliminated.

Creation of the Gent's Ridge Ponds 2 and 3 also has the potential to impact and be impacted by the geology of the project area. The Gent's Ridge 2 pond lies within a surface fissure resulting from DSGS, which could pose a constraint to the construction of the pond if the fissure is active. If the pond liner were to be stretched to the point of tearing, the water within would then drain down into the deep subsurface. PDC for mitigating the effects of a rapid expansion of the fissure have been included in **Table 2-4**. Given the proximity of the proposed Gent's Ridge 3 pond to the Gent's Ridge 2 pond, similar effects may occur and PDC have been added regarding the implementation of Gent's Ridge Pond 3 to ensure similar precautions are taken if necessary (refer to **Table 2-4**). Given these PDC, there would be no expected impacts to the geology of the project area from the proposed snowmaking ponds nor would the ponds be geologically constrained.

Soils

Of the nine soil map units described in **Table 3.4-1**, the Proposed Action would directly disturb approximately 82.7 acres of NFS lands and 124.2 acres of private lands within six map units. Of this disturbance, approximately 13.2 acres on NFS lands and 21.5 acres on private lands would be



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temporary and would be reclaimed following project implementation. Examples of temporary activities include installing snowmaking pipelines and widening the existing abandoned logging/mining road for temporary construction access. Disturbance

would occur as a result of grading, vegetation clearing, combined vegetation clearing and grading, or glading. The estimated acreage of disturbance by soil map unit, project, surface ownership, and disturbance type is presented in **Table 3.4-2**.

Table 3.4-2. Proposed Action Disturbance by Soil Map Unit, Surface Ownership, and Disturbance Type

SOIL MAP UNIT/PROJECT/ DISTURBANCE TYPE	NFS LANDS (ACRES)	PRIVATE LANDS (ACRES)	EROSION HAZARD RATING
351C (Pandora Trails, Pump Station, Snowmaking Ponds, Snowmaking Pipelines)			
Grading	1.5	3.4	Severe
Vegetation Clearing	0.3	-	
Grading and Vegetation Clearing	0.4	0.4	
Glading	-	-	
Total	2.1	3.8	
381B (Pandora Trails and Gladed Terrain, Maintenance Access Road, Snowmaking Ponds, Snowmaking Pipelines)			
Grading	4.7	15.4	Moderate
Vegetation Clearing	0.9	0.6	
Grading and Vegetation Clearing	3.0	1.5	
Glading	0.1	1.5	
Total	8.7	19.0	
604C (Pandora Lift Corridor and Terminals, Pandora Trails and Gladed Terrain, Boundary Egress Ski Trail, Maintenance Access Road, Snowmaking Pipelines)			
Grading	1.0	0.3	Severe
Vegetation Clearing	20.5	5.6	
Grading and Vegetation Clearing	1.7	-	
Glading	24.0	12.2	
Total	47.2	18.1	
Grading	5.3	6.8	Moderate

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Table 3.4-2. Proposed Action Disturbance by Soil Map Unit, Surface Ownership, and Disturbance Type (cont.)

SOIL MAP UNIT/PROJECT/ DISTURBANCE TYPE	NFS LANDS (ACRES)	PRIVATE LANDS (ACRES)	EROSION HAZARD RATING
650B (Pandora Lift Corridor and Terminals, Pandora Trails and Gladed Terrain, Boundary Egress Ski Trail, Snowmaking Pipelines)			
Vegetation Clearing	1.6	17.5	
Grading and Vegetation Clearing	-	2.3	
Glading	7.2	55.5	
Total	14.1	82.1	
654D (Pandora Trails, Maintenance Access Road, Snowmaking Ponds, Snowmaking Pipelines)			
Grading	1.3	0.3	Severe
Vegetation Clearing	0.2	-	
Grading and Vegetation Clearing	2.3	-	
Glading	-	-	
Total	3.8	0.3	
670C (Pandora Lift Terminals, Pandora Trails and Gladed Terrain, Boundary Egress Ski Trail, Maintenance Access Road, Snowmaking Pipelines)			
Grading	0.3	0.5	Severe
Vegetation Clearing	5.1	0.2	
Grading and Vegetation Clearing	1.1	0.1	
Glading	0.3	0.1	
Total	6.8	0.9	
Overall Total Disturbance	82.7 acres NFS Lands	124.2 acres Private Lands	206.9 acres of Total Disturbance

Anticipated impacts to soils from the Proposed Action include the removal of vegetation, increased susceptibility of the soils to wind and water erosion, mixing of soil horizons, soil compaction, and loss of topsoil productivity. These impacts would be greatest in areas where grading is proposed, while less impact would occur in areas of vegetation removal and glading without

grading. Grading activities would occur during construction of the Pandora lift terminals, Pandora boundary egress ski trail, long-term maintenance access road, temporary construction access road, burial of an overhead powerline, and new trail breakovers. These activities and resulting impacts would conform to the WCPH and

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Forest Plan standards and guidelines identified in **Section 3.4.1**.

Approximately 59.9 acres of disturbance would occur on NFS lands rated as severe for soil erosion hazard; however, only 22.6 of these acres would involve grading activities. Soil losses and sedimentation due to erosion would be long-term but would return near to natural rates after vegetation is re-established and stabilizes reclaimed areas (in approximately two to five years following reclamation). Decreases in soil productivity would be long-term in all reclaimed areas and soil productivity would likely be reduced for many years before pre-disturbance conditions are restored. Direct impacts would be reduced with proper implementation of a post-construction revegetation and restoration methods identified in the Construction Implementation Plan (refer to **Table 2-4**). PDC have also been included to monitor that the levels of organic matter within the project area are maintained (refer to **Table 2-4**).

Indirect impacts to soil resources would include the additional loss of soil from erosion caused by increased vehicle traffic on new access roads for maintenance of ski trails, access roads, water bars, and any other infrastructure that would require upkeep. The indirect impacts associated with increased vehicle traffic on new roads would be long-term and would require long-term application of BMPs. Additional indirect impacts could occur from soil compaction caused during glading and vegetation clearing operations. Compaction would reduce aeration, permeability, and water-holding capacity of the soils. These impacts would be localized in nature, and long-term.

3.4.4 Cumulative Effects

Past development at Aspen Mountain has increased erosion rates and sedimentation in comparison to undisturbed areas within the project area; general ski resort development and access roads have increased impermeable surfaces and soil compaction and reduced soil productivity between pre-development and present conditions. Possible cumulative effects to soil resources would be associated primarily with potential soil loss from erosion and loss of soil productivity. When considered cumulatively with all past, present, and reasonably foreseeable future actions, cumulative impacts to soil resources would be negligible. Similarly, the incremental additional effects on local slope stability, including Keno Gulch, would be negligible.

3.5 WATERSHED

3.5.1 Affected Environment

Additional details of the watershed analysis, including applicable laws, regulations, and policy are described in the *Pandora Development and Summit Snowmaking Hydrology Report* (Hydrology Report), contained in the project file (Resource Engineering 2018a). The Forest Plan and the Region 2 Watershed Conservation Practices Handbook (WCPH) provide stream health management measures and design criteria to ensure applicable federal and state laws are met. The Forest Plan addresses expectations for Management Area 8.25 (Ski Areas—Existing and Potential) with Standard 3, which states:

Snow management, including snowmaking and snow-farming, will be conducted in a manner that prevents slope failures and gully erosion, as well as bank erosion and sediment damage in receiving channels.

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In addition, the WCPH contains several Management Measures (MM) which are environmental goals to protect aquatic and riparian systems. These MM are described in detail within the Hydrology Report.

Project Area Watersheds

The Proposed Action is located within four watersheds. Portions of the Summit Snowmaking project as well as the entire Pandora area development are located within three watersheds drained by unnamed ephemeral tributaries (Tributary #1, Tributary #2, and Tributary #3) to the Roaring Fork River. The remaining portion of the Summit Snowmaking project component is within the Spar Gulch watershed and drained by a first-order stream (Spar Gulch) that contributes to the Roaring Fork River. Spar Gulch flows as an intermittent stream from just below the Summer Road at an approximate elevation of 10,250 feet to just above Summer Ditch, which intercepts all Spar Gulch flows at an approximate elevation of 9,970 feet. The intercepted flows are then conveyed by the ditch to the west side of the mountain and discharged in the upper elevations of Keno Gulch, a natural drainage that contributes to Castle Creek, a tributary to the Roaring Fork River. Keno Gulch has exhibited slope stability issues in the past, including a landslide in 1996 that was attributed to snowmelt during a major warming trend (refer to **Section 3.4**) (USGS 1997). The drainage area above Summer Ditch (Upper Spar Gulch) totals 197 acres. The three un-named tributaries (Spar Gulch, Summer Ditch, Keno Gulch) and the Roaring Fork River are depicted on **Figure 4**.

Currently, surface runoff originating downstream from the Summer Ditch flows in

a steep, eroded channel that follows the fall line of the *Spar Gulch* ski trail. The stream is ephemeral at first, flowing only in response to snowmelt and after significant rainfall precipitation, and then transitions to an intermittent flow below the confluence with the Copper Gulch at around 9,070 feet. At an elevation of approximately 8,470 feet the eroded channel flows into a series of four sediment traps constructed near the bottom terminal of the Bell Mountain chairlift.

The sediment traps discharge onto the forested slope located to the east of the *Little Nell* ski trail, where observations indicate that runoff flowing into the sediment traps infiltrates and continues as shallow groundwater until it re-surfaces at an elevation of approximately 8,150 feet. From there, it discharges into the City of Aspen's storm sewer system, and ultimately into the Roaring Fork River. The drainage area of the Lower Spar Gulch Watershed (downstream from the Summer Ditch diversion) is 354 acres.

To determine existing watershed conditions, an assessment was conducted according to the Forest Service-developed Watershed Condition Classification (WCC). The WCC is based on a weighted average of twelve physical and biological indicators; however, this analysis is based on three of the five physical indicators: water quality, water quantity, and roads and trails. Refer to the Hydrology Report for rationale detailing the dismissal of the remaining physical and biological indicators and for more detail regarding the indicators carried forward. **Table 3.5-1** presents a summary of the scores assigned to each study watershed indicator carried forward.

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Table 3.5-1. Scores of Physical Indicators for the Study Watersheds

WATERSHED	WATER QUALITY	WATER QUANTITY	ROADS AND TRAILS
Spar Gulch	Fair	Poor	Poor
Tributary #1	Good	Good	Good
Tributary #2	Good	Good	Fair
Tributary #3	Good	Good	Fair

The Spar Gulch watershed appears to be in less than *Good* condition based on the three available indicators; however, the three unnamed tributaries to the Roaring Fork River appear to be in *Good* condition and are functioning properly (i.e., they have high hydrologic integrity.) More detail on each specific indicator on the existing conditions of watershed health (water quality, water quantity, and roads and trails) is provided in this section.

Water Quality

No water quality impairments have been identified for the three un-named tributaries to the Roaring Fork River and are, therefore, rated as *Good*. Evidence of high sediment loads, as well as areas of erosion near the Spar Gulch channel, have been documented for the Spar Gulch watershed. As discussed above, the Spar Gulch channel flows through a series of sediment traps before discharging in to the City of Aspen's storm sewer system where it eventually discharges into the Roaring Fork River. It is not known how much of the Spar Gulch sediment reaches the Roaring Fork River. Therefore, the Spar Gulch watershed is rated as *Fair*.

LATERAL EROSION ON SPAR GULCH CHANNEL



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Water Quantity

In terms of water quantity, the baseline and existing modeled water yields and peak flows present within the three un-named watersheds, as well as for the Upper Spar Gulch and Lower Spar Gulch, are summarized in **Table 3.5-2**. Yield of the study watersheds was estimated using the methodologies presented in the WRENSS

Procedural Handbook; however, other methodologies exist for calculating streamflow statistics and the results of these other methodologies and reports are available within the Hydrology Report and project file (USEPA 1980). For more details on why the WRENSS model was chosen over others, please see Section 3.2.2 of the Hydrology Report.

Table 3.5-2. Water Yield and Peak Flow for Baseline and Existing Conditions

WATERSHED	BASELINE		EXISTING	
	WATER YIELD (ACRE-FEET)	PEAK FLOW (CFS)	WATER YIELD (ACRE-FEET)	PEAK FLOW (CFS)
Spar Gulch at Summer Ditch	70	0.6	211	2.3
Spar Gulch at City of Aspen	228	2.2	328	3.3
Tributary #1	117	1.2	147	1.4
Tributary #2	166	1.7	218	2.1
Tributary #3	141	1.4	155	1.5

In general, water yields and peak flows are influenced by vegetation clearing resulting in higher intensity peak flows that occur earlier in the runoff season. This happens because of higher volume and increased rate of snowmelt caused primarily by decreased evapotranspiration and increased solar radiation. In addition, roads, trails, and drainage structures like ditches also have an influence on peak flows by influencing flow regimes and reducing opportunities for infiltration. However, as man-made snow and snow compaction from ski traffic can delay snowmelt, human influence on watershed condition may be mixed in terms of water yields and peak flows. Regardless, the existing conditions within the project area watersheds are likely already influenced by anthropogenic vegetative clearing and snowmaking.

The above watershed yield and streamflow values calculated correspond to average conditions of precipitation and temperature. Most of the water supply for watersheds in the Colorado Rocky Mountains comes from snowpack and snowmelt during the summer, both of which can vary measurably from year to year. As a result, annual yield and streamflow can also vary from year to year. Yields and peak flows were computed for typical dry and wet years (2012 and 2011) for the Spar Gulch watershed. In those examples, the watershed yield was 55 percent higher and 29 percent lower than average in the wet and dry years, respectively. In other words, the watersheds within the project area are characterized by wide variations in yield and streamflow from year to year.

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The existing conditions discussed above were compared to baseline conditions for the four watersheds to determine their WCC rating. For example, the Spar Gulch yield and hydrograph are greatly impacted by the Summer Ditch diversions, extensive tree clearing, and snowmaking applications. Spar Gulch is therefore rated as *Poor* for water quantity due to the substantial difference in magnitude, duration, and/or timing of annual extreme flows from the baseline/natural hydrograph. The three unnamed tributaries have no or minor departures from natural conditions and are therefore rated as *Good*.

Roads and Trails

Roads and trails can impact water quality and quantity depending on the density, state, and proximity to water of this road and trail network. Roads contribute more sediment to streams than any other land use and can also alter peak flows and timing through changing the channel network of the watershed.

Road Density

Given a WCC threshold of 2.4 miles per mile squared or more as a road density for a *Poor* rating, three of the four watersheds are rated as *Poor*. Only the Tributary #1 watershed is rated as *Good* because of its density rating of 0.28 mile per square mile.

Road and Trail Maintenance

Road and trail maintenance is based on the percent of roads and trails where adequate BMPs have been implemented to maintain proper drainage conditions. The main mountain road, Summer Road, as well as the secondary roads on Aspen Mountain were generally well maintained. However, the steep Spar Gulch trail and the other road drainage features (such as road culverts, ditches, and waterbars) did not include BMPs. The Spar Gulch trail specifically is in poor condition and exhibited erosion patterns, ruts on the road surface, and road culverts partially blocked with road sediment. BMPs for maintenance of drainage features applied to less than 50 percent of the roads and trails in the watershed, and as a result the road and trail maintenance attribute for each watershed is rated as *Poor*.

SPAR GULCH
TRAIL CULVERT
DISCHARGE INTO THE
SPAR GULCH CHANNEL,
PARTIALLY BLOCKED
WITH ROAD SEDIMENT



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Proximity to Water

Proximity to water is an important factor in the roads and trails indicator because roads and trails are usually a primary source of channelized connection between disturbed soils and the stream channel. This attribute is based on the percentage of roads and trails within 300 feet of streams and water bodies, or that are hydrologically connected to them. Roads and trails that are hydrologically connected to waterbodies/stream channels are Connected Disturbed Areas (CDA).

CDAs are of particular concern due to their continuous connection between high runoff areas and water bodies. Whereas a road/trail's proximity to streams or water bodies can circumstantially contribute sedimentation and influence flow regimes, CDAs provide a direct, perennial connection between roads/trails and water bodies. On Aspen Mountain, roads and trails exist in proximity of the study watersheds' drainage channels; however, these are intermittent and ephemeral streams and a "continuous surface flow path" to a perennial stream was not identified for any of the study watersheds. Therefore, the concept of CDAs is not fully applicable but still valuable in understanding how disturbed areas affect runoff, peak flow, and sediment transport in the drainage network (USDA Forest Service 2018). Only the Spar Gulch watershed contained CDAs, with a total of 3.1 acres within its boundary. Overall, only Spar Gulch had a rating of *Poor* for the proximity to water indicator due to 31 percent of its roads and trails being within 300 feet of a channel as well as 3.1 acres of CDA. The rest of the watersheds are rated *Good* for proximity to water.

Mass Wasting

One other factor contributes to an overall road and trail rating of a watershed: mass wasting. The mass wasting attribute is based on if roads are located on unstable

landforms or rock types subject to mass wasting or have contributed to sediment loading in a stream channel. Of the four water sheds, only Spar Gulch has contributed to sediment loading within a stream channel. As a result, all three un-named tributaries were rated as *Good* and Spar Gulch was rated as *Poor* for the mass wasting categories.

Based upon the scores given to the attributes discussed above, the Roads and Trails indicator was rated for the study watersheds under current conditions. Spar Gulch rated *Poor*; the Tributary #1 watershed rated *Good*; and the remaining two study watersheds were classified as *Fair* for the Roads and Trails indicator.

Snowmaking

An assessment of historic snowmaking water use at ASC over the most recent five-year period shows that Aspen Mountain utilizes on average 184.1 acre-feet of water per season for snowmaking purposes. This yields an average ratio of 1.07 acre-feet of snowmaking diversions per treated acre. Aspen Mountain draws its water supply from the City of Aspen's municipal system. The City of Aspen primarily receives its water from Castle Creek and Maroon Creek.

3.5.2 Environmental Consequences of the Proposed Action

The various project components, including vegetation clearing, grading, and snowmaking, have the potential to increase erosion and sediment loading within the watersheds as well as impact water yields and peak stream flow. The proposed activities would require appropriate measures in order to "Maintain or Improve" stream health in accordance with the WCPH and the 2002 Forest Plan Management Area 8.25 Standard 3. Relevant PDC for construction of proposed mountain roads,

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snowmelt runoff management, and other general BMPs to improve watershed health are available in **Table 2-4**.

Water Quality and Quantity

Higher watershed yield and associated surface runoff from the Proposed Action has the potential to impact water quality. Impacts would result from 1) tree clearing and implementation of additional snowmaking, and 2) ground disturbance from snowmaking pipeline construction, road construction, lift construction, and terrain grading. Impacts would include increased amounts of sediment loading in the study watersheds' drainage channels. Project components that involve tree clearing and terrain grading in proximity to ephemeral stream channels are of particular concern. In addition, the increased water applied to the CDA within Spar Gulch could increase sediment entering the from the CDA as well as sediment production from within the existing channel network itself where erosion and sedimentation are already common. These projects would require proper design, construction, and maintenance of BMPs for erosion and sediment control within the watersheds to address the 2002 Forest Plan Management Area 8.25 Standard 3. The relevant PDC for mitigating these water quality issues can be seen in **Table 2-4**. With

implementation of these PDC, impacts to water quality are expected to be negligible.

The vast majority of the proposed tree cutting would occur within the un-named Tributary #2 and Tributary #3 watersheds, while the proposed snowmaking project would take place within the Spar Gulch, Tributary #1, and Tributary #2 watersheds. Without mitigation, the proposed projects would result in increased water yields and peak flows during the snowmelt runoff season—in all of the study watersheds—because of the tree removal and new snowmaking coverage. Removal of trees reduces the amount of water intercepted, stored, and transpired by the forest; therefore, an increase in water yield may be expected. Introduction of snowmaking water into the watersheds could further increase water yield, specifically in the Upper Spar Gulch, Tributary #1, and Tributary #2 watersheds. As Summer Ditch intercepts all surface runoff from Upper Spar Gulch, water yields within Lower Spar Gulch would not be expected to increase; however, installation of a splitter box on Spar Gulch would divert 23.3 acre-feet to the Lower Spar Gulch watershed.

Table 3.5-3 and **Table 3.5-4** summarize the expected changes to water yield and peak flows from the Proposed Action, without the proposed mitigation applied.

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Table 3.5-3. Modeled Water Yield Change under the Proposed Action, without Mitigation

WATERSHED	WATER YIELD (ACRE-FEET)			CHANGE	
	BASELINE	EXISTING	PROPOSED	(ACRE-FEET)	(%)
Spar Gulch at Summer Ditch	70	210.5	233.8	23.3	11%
Spar Gulch at City of Aspen	228	327.6	327.6	0.0	0%
Tributary #1	117	146.7	162.6	15.9	11%
Tributary #2	166	217.6	254.4	36.8	17%
Tributary #3	141	155.1	187.6	32.5	21%

Table 3.5-4. Modeled Peak Flow Change under the Proposed Action, without Mitigation

WATERSHED	PEAK FLOW (CFS)			CHANGE	
	BASELINE	EXISTING	PROPOSED	(CFS)	(%)
Spar Gulch at Summer Ditch	.6	2.3	2.4	0.1	4%
Spar Gulch at City of Aspen	2.2	3.3	3.3	0.0	0%
Tributary #1	1.2	1.4	1.5	0.1	7%
Tributary #2	1.7	2.1	2.5	0.4	19%
Tributary #3	1.4	1.5	1.7	0.2	13%

A detailed report completed in 2010 concluded that due to historical slope stability problems on Keno Gulch, increased water yield and flow in the Summer Ditch (which flows to Keno Gulch) need to be curtailed (McCalpin 2010). The report envisioned an alternative that would capture Upper Spar Gulch runoff near the Summer Road and pipe it off the mountain. At this time, however, it appears that this option is not viable. An alternative device to accomplish the same goal of preventing the volume of runoff associated with the proposed snowmaking from discharging into Keno Gulch would consist of using a

hydraulic structure, like a splitter box, at the head of the Summer Ditch. For the Upper Spar Gulch/Keno Gulch application, the WRENS model show that under average conditions of precipitation and temperature, the proposed snowmaking would result in a runoff increase of 23.3 acre-feet, or 11 percent relative to existing conditions. Thus, a splitter box installed where the Summer Ditch intercepts the Spar Gulch channel and designed to keep 11 percent of the annual surface runoff from entering the Summer Ditch, would effectively maintain current conditions in the Keno Gulch drainage.

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The above-described proposed mitigation would result in water yield and peak flow increases for the Lower Spar Gulch watershed. The 23.3 acre-feet of additional yield would represent a 7 percent increase as compared to existing conditions in Lower Spar Gulch. This in turn has the potential to negatively affect the City of Aspen's storm drainage system that receives runoff from Lower Spar Gulch. A review of the City's Surface Drainage Master Plan indicates that the storm sewer system that receives Spar Gulch runoff has a total capacity of 72 cfs (WRC 2001). The Surface Drainage Master Plan concludes that the "flow associated with snowmelt is relatively small but of long duration, and the snowmelt also conveys sediment that is deposited in the stream channels, streets, and storm sewers." The Master Plan states that the snowmelt flows and deposits are "more of a maintenance problem" as opposed to the risks of property damage and loss of life associated with mudflows and stormwater flows.

Currently, Lower Spar Gulch, between approximately 250 feet below the Summer Ditch and the bottom terminal of the Bell Mountain chairlift, is drained by channel-formed infill materials, which shows evidence of on-going erosion problems. Additionally, a service road runs parallel and in close proximity to the channel for almost its entire length. The road is constructed on a steep grade and its surface consists of loose materials that are easily transported by surface runoff into the Lower Spar Gulch channel. Most of the sediment transported by

the Lower Spar Gulch flows is generated in the channel itself and from the adjacent road surface. To minimize or avoid the potential effects resulting from the increased yield and runoff peak flow, the Lower Spar Gulch channel should be improved.

More specifically, the section of channel from just below the confluence with Copper Gulch to the sediment traps by the Bell Mountain chair bottom terminal should be reconstructed as a riprap-lined feature. Riprap placed on adequate bedding and properly compacted sub-grade would eliminate or minimize channel erosion processes. Improving the road surface and installing adequately spaced road waterbars would help minimize the amount of road surface reaching the Lower Spar Gulch channel. In addition, decommissioning and re-vegetating the 1,500-foot-long road between the bottom of Bell Mountain chair and Kleenex Corner would disconnect about 0.45 acre of CDA and substantially reduce the amount of sediment loading into the Lower Spar Gulch channel. These improvements would also reduce velocities of surface runoff and thus result in a decrease of Lower Spar Gulch peak flows. The sediment traps currently located next to the Bell Mountain chair bottom terminal should also be improved to maximize the amount of sediment removed from the Spar Gulch flow.

Table 3.5-5 summarizes the expected changes to water volume with the above mitigation included.

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Table 3.5-5. Average Volumes of Runoff under Proposed Conditions with Mitigation

WATERSHED	RUNOFF VOLUME (ACRE-FEET)		CHANGE	
	EXISTING	PROPOSED	(ACRE-FEET)	(%)
Upper Spar Gulch	210.5	233.8	23.3	11%
Summer Ditch	210.5	210.5	0.0	0%
Lower Spar Gulch	327.6	327.6	23.3	7%
Tributary #1	146.7	162.6	15.9	11%
Tributary #2	217.6	254.4	36.8	17%
Tributary #3	155.1	187.6	32.5	21%

The proposed activities would require appropriate measures in order to “maintain or improve” stream health in accordance with the WCPH and 2002 Forest Plan Management Area 8.25 Standard 3. All projects involving terrain grading would require measures, including installation and maintenance of adequate BMPs for erosion and sediment control, in order to avoid or minimize potential negative effects to the watershed condition. Proposed measures to be implemented with the Proposed Action are outlined in the Hydrology Report and referenced in **Table 2-4**.

Roads and Trails

The proposed projects include construction of a 4,300-foot-long road that would be needed for maintenance of the new Pandora lift. An additional road would be also constructed to assist in the building of the Pandora lift. This road would follow the alignment of an existing, abandoned mining/logging road that would be temporarily widened to accommodate construction vehicles. Following completion of the Pandora Lift construction, the entire length (including the 3,000-foot-long

existing old mining road) would be reclaimed to original contours and revegetated. Adherence to relevant PDC would reduce erosion and sediment loading in ephemeral streams and reclamation of the abandoned Spar Gulch road would reduce total bare ground relative to existing conditions.

Snowmaking

As previously mentioned, Aspen Mountain utilizes on average 184.1 acre-feet of water per season for snowmaking purposes. This yields an average ratio of 1.07 acre-feet of snowmaking diversions per treated acre. Based upon this ratio, the 53 acres of new snowmaking coverage would require approximately 56.7 acre-feet of additional water diversions. Total water diversions would increase to 240.8 acre-feet.

3.5.3 Cumulative Effects

Water Quality

Because there are no impacts to water quality anticipated from any of the project components proposed in the Proposed Action there would be no cumulative impacts to water quality.

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Water Quantity

For the average conditions of temperature and precipitation typically present at Aspen Mountain, total losses to evaporation, sublimation, and evapotranspiration amount to approximately 26 percent. The remaining 74 percent is available as surface runoff and shallow groundwater to the receiving Roaring Fork River. Depletions associated with the Proposed Action would therefore amount to 14.7 acre-feet and would be lost from the watershed.

Instream flows are non-consumptive, in-channel water rights owned by the Colorado Water Conservation Board (CWCB) and administered within the State of Colorado water right priority system with the purpose of preserving or improving the natural environment to a reasonable degree. Instream flows for the segment of the Castle Creek where the City of Aspen draws its water is 12.0 cfs. Similarly, the instream flow downstream from the City of Aspen's diversion on Maroon Creek is 14.0 cfs. A recent study by Resource Engineering in 2018 concluded that, under current hydrological conditions, streamflows in Maroon Creek and Castle Creek are sufficient to support both the CWCB minimum instream flows and the City of Aspen's municipal and snowmaking water demands (Resource Engineering 2018b). Even under future drought conditions, streamflows in Maroon and Castle creeks are expected to exceed the instream flow requirements set by CWCB, even given municipal and snowmaking use. However, these excesses are estimated to be small especially in the peak snowmaking month of December, indicating that some snowmaking shortages are possible under drought conditions. Should water for snowmaking not be available, snowmaking would not occur.

The City of Aspen receives all water from Spar Gulch through the City of Aspen's storm sewer system before discharging into the Roaring Fork River. Implementation of the PDC identified in **Table 2-4** would reduce sediment loading entering Spar Gulch and, therefore, the City of Aspen storm sewer system. Installation of a splitter box on Spar Gulch to divert runoff from entering Summer Ditch, however, would increase potential water yield reaching the City of Aspen by 23.3 acre-feet.

Watershed Condition

The proposed tree removal, snowmaking applications, and associated increases in watershed yield and peak streamflows discussed above would not have a measurable effect at the cumulative effects scale. Despite direct project effects of the Proposed Action, when considered cumulatively, in addition to past, present, and reasonably foreseeable future actions, implementation of the Proposed Action would maintain stream health and watershed condition given successful implementation of the PDC described in **Table 2-4**. By maintaining the health of the study watersheds, potential cumulative effects would be negligible from the Proposed Action.

3.6 VEGETATION

This analysis centers around the species listed by the Regional Forester as sensitive as described in the Biological Evaluation (BE) (Western Bionomics 2018a). Federally listed plant species described within the Biological Assessment (BA) have been dismissed from detailed analysis in this EA due to lack of habitat within the project area (Western Bionomics 2018b). Refer to **Table 1-2** for a full list of resources that have been dismissed from detailed analysis.

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LEFT TO RIGHT: TRIANGLELOBE MOONWORT, COLORADO TANSY-ASTER

3.6.1 Affected Environment

It is the objective of the Forest Service to develop and implement management practices to ensure that species do not become threatened or endangered because of Forest Service actions (Forest Service Manual 2670.22). For a full list of sensitive plant species identified by the WRNF for which population viability is a concern, see the BE. Based on documented habitat affinities, two species were determined to have potential habitat in the project areas: Trianglelobe moonwort (*Botrychium ascendens*) and Colorado tansy-aster (*Machaeranthera coloradoensis*).

Moonworts (*Botrychium* spp.) are small, inconspicuous, and often ephemeral species which may not appear above the ground every year. Mixed species groups are also common; if one species is observed above ground, it is possible that other species may exist below ground at the same site and may remain undetected. Most moonworts are considered habitat generalists, and habitat types vary considerably between known sites.

Common threats to this species include any ground disturbing activities such as road maintenance and construction, mine reclamation activities, trampling by cattle, hikers or ATVs, over-collection, and alteration of soil and hydrological regimes (Beatty et al. 2003). Ski trail development through closed-canopy forests in Colorado appears to have benefited some moonwort species by creating potential habitat, as ski runs are known to provide habitat for some moonwort species when adequate time has passed following disturbance.

In Colorado, Colorado tansy-aster has been found in montane to alpine environments from 7,675 to 12,940 feet in elevation, where it occupies grasslands, open areas in ponderosa or bristlecone pine, pinyon/juniper woodlands, alpine fellfields, and alpine meadows (Beatty et al. 2004). Within these areas, it grows on slopes, bluffs, ridges, flats, roadsides on calcareous sedimentary substrates (e.g., limestone, dolomite, and shale), volcanic, or granitic substrates. It is found in both dry and mesic sites with open exposure, but the slope and

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aspect vary. Habitat of the Colorado tansy-aster can be affected by unregulated recreation, mining, road construction, ATV and snowmobile use, and invasive species (Beatty et al. 2004).

Botanical surveys were conducted in the project area on August of 2017 and covered 100 percent of the snowmaking line installation corridor and the pond locations. In the Pandora project area, surveys were conducted in previously disturbed sites where the species are likely to occur. The botanical survey discovered one moonwort population consisting of approximately twelve individuals somewhat outside of the snowmaking corridor. All individuals were identified as *B. minganense*, a more common, less sensitive species of moonwort. No other sensitive species, including Colorado tansy-aster, were observed.

3.6.2 Environmental Consequences of the Proposed Action

As there were no individuals or populations of Colorado tansy-aster observed in the project area, the project would have *no impact* on this species.

Although no occurrences of the sensitive moonwort species *B. ascendens* were observed during botanical survey, there is potential habitat in the snowmaking project area and common habitat associates were observed; therefore, it is possible that moonwort may be present and undetected. Potential direct impacts to moonworts would result from trampling, crushing, or uprooting of individuals by machinery during construction and could include death, reduced growth and development, or reduced or eliminated reproduction. If direct impacts to the undetected moonworts are large enough, the reduced population size may change the overall meta-population structure, potentially affecting species viability on the planning unit or rangewide.

Similar to the direct impacts described above, indirect impacts would occur only if *B. ascendens* exists in the project area but remained undetected. Indirect effects would include potential noxious weed invasion, altered hydrologic patterns, erosion, sedimentation, or increased dust from vehicular construction traffic, all of which may be a detriment to moonwort.

Implementation of the Proposed Action would comply with direction provided in the [Forest Plan](#) as well as relevant PDC. Relevant PDC include adequately revegetating disturbance areas, controlling noxious weeds, and conducting pre-construction botanical surveys. Refer to **Table 2-4** for information on both the Noxious Weed Management Plan and Post-Construction Revegetation and Restoration Plan. In combination with these PDC, the implementation of the Proposed Action *may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend toward federal listing or a loss of species viability rangewide* for *B. ascendens*.

3.6.3 Cumulative Effects

The Proposed Action, when combined with other past, present, and reasonably foreseeable future actions at Aspen Mountain, could alter *B. ascendens* occurrences and habitats. Examples of these actions include past project development, ski trail clearing, motorized and non-motorized recreational use, road and trail building and maintenance, insect and disease outbreaks, fire suppression, road construction, urban development, noxious weed infestation, and ditch construction. All of these actions could have a negative impact on this species; however, actions that clear the forest canopy while minimizing ground disturbance or soil sterilization and avoid the introduction of noxious weeds may be beneficial to moonworts by creating potential habitat.

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3.7 WILDLIFE AND FISH

The following wildlife and fish analysis is a summary of the technical analyses contained in the BA and BE prepared specifically for this project. The BA and BE are contained in the project file.

3.7.1 Affected Environment

The BA includes detailed information regarding federally listed threatened, endangered, and proposed (TEP) terrestrial and aquatic wildlife species that may occur or could potentially be affected by the Proposed Action. Sensitive species whose population viability has been identified as a concern by the WRNF are analyzed in the BE. The following discussion summarizes information specific to TEP species (Canada lynx and four species of Upper Colorado River fish), WRNF-specific sensitive species (American marten, hoary bat, northern goshawk, boreal owl, flammulated owl, and olive-sided flycatcher), and species of local concern (elk). Migratory birds are analyzed in the BE, and a PDC is included in **Table 2-4** to minimize potential impacts to migratory birds.

Mammals

Canada Lynx

Canada lynx (*Lynx canadensis*) are listed by the USFWS as threatened. Lynx Analysis Units (LAUs) approximate the size of an area used by an individual lynx and are the scale at which the effects of management activities are evaluated. The Aspen Mountain SUP area is located primarily within the Independence Pass LAU but also partially within in the Maroon Bells LAU. Because all impacts to lynx vegetation within the project area would occur in the Independence Pass LAU, this analysis will focus only on that LAU.

Within the Independence Pass LAU, 56 percent of mapped lynx vegetation on NFS

lands is suitable (e.g., primary or secondary habitat) for the Canada lynx. Within the project area, there is a mixture of primary and secondary habitat. Field coverboard surveys conducted in 2018 identified that some of this lynx habitat is winter snowshoe hare habitat (defined as conifer stands with horizontal cover greater than 35 percent) and some is not. The areas involved in the SUP boundary adjustments provide equivalent winter snowshoe hare habitat.

Lynx potentially use the current project area to traverse the landscape; however, given proximity to the existing trail network, the lynx habitat within the ski area operational boundary and the project area is likely degraded in its effectiveness. Furthermore, lynx feed substantially on snowshoe hares, and the USFWS has concluded that “although high quality lynx habitat may occur adjacent to ski trails, its functionality is likely degraded by the winter elimination of hares due to human intrusion and disturbance” (Broderdorp 2016).

Elk

CPW estimates elk (*Cervus canadensis*) herd populations and sets management objectives at the scale of Data Analysis Units (DAUs). Aspen Mountain is located within DAU E-15, the Avalanche Creek DAU. DAU E-15 consists of 543,879 acres or approximately 850 square miles of land in portions of Eagle, Pitkin, and Garfield and Gunnison Counties (CPW 2013). CPW has also mapped production (calving) range for elk below the project area in the McFarlane Creek drainage and eastward along the mid-slopes of the Roaring Fork drainage.

The project area, particularly the Pandora area, has some components of effective habitat for elk calving, as hiding cover is widely available and well distributed throughout the Pandora area in aspen and conifer forests; however, free water is

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noticeably absent. In addition, surveys conducted in early July 2018, shortly after the end of the elk calving period, did not reveal any evidence of recent (2018 calving period) occupancy of the project area by elk.

American Marten

The American marten (*Martes Americana*) is found in spruce/fir forests and lodgepole pine stands and is a WRNF sensitive species. The mountain pine beetle epidemic has killed countless thousands of acres of pure lodgepole pine stands that historically provided habitat for marten, although studies suggest that the species is relatively common even in bark beetle areas that have been managed (USDA Forest Service 2012). Optimal marten habitat consists of mesic, dense coniferous forests with complex physical structure near the ground. During the winter, martens seek out mature conifer stands, most likely because of the dense overhead cover, availability of prey species, and adequate woody and rocky structure beneath the snow to provide subnivean travelways and roost dens for marten to live

and hunt beneath the snow. The project area, primarily the Pandora area, contains stands of lodgepole pine and spruce/fir that provide potential habitat for martens.

Hoary Bat

The hoary bat (*Lasiurus cinereus*) is the most widespread of American bats and is a WRNF sensitive species. Hoary bats are found statewide in Colorado from the plains to timberline. This solitary tree roosting bat uses mixed conifer, lodgepole pine, ponderosa pine, piñon-juniper, and cottonwood/willow riparian habitats. Individuals have been captured at elevations exceeding 9,000 feet. The project area, primarily the Pandora area, contains forested stands that provide potential habitat for the hoary bat.



CLOCKWISE FROM
TOP LEFT:

CANADA LYNX
AMERICAN MARTEN
HOARY BAT
ELK

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Fish

Upper Colorado River Fish

The Upper Colorado River Basin is home to the USFWS-listed endangered humpback chub (*Gila cypha*), bonytail chub (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), and razorback sucker (*Xyrauchen texanus*). These fish are found only in the Colorado River system. None of the four endangered fish are found any closer to the project than the main stem of the Colorado River near Rifle, Colorado; however, activities resulting in water depletions in the Upper Colorado River Basin may impact the continued survival of the four endangered fish (USFWS 1999). In 1988 the Upper Colorado River Endangered Fish Recovery Program (Recovery Program) was established to prevent the extinction of the four endangered fish. To further define and clarify processes outlined in the Recovery Program related to the Colorado River Basin depletions, a Section 7 Agreement and a Recovery Implementation Program Recovery Action Plan were developed in 1988 (USFWS 1993). Water Depletions that began before

that date are considered historic depletions, and after that date are considered new depletions. Together, the Section 7 Agreement and Recovery Action Plan require that projects with a federal nexus and new depletions undergo Section 7 consultation and establish a Recovery Agreement to avoid the likelihood of jeopardy and/or adverse modification of critical habitat from the depletion impacts.

Currently, all of Aspen Mountain's water use are historic depletions. Based on snowmaking records for the past five seasons, ASC uses on average 184.1 acre-feet of water per season to make snow on Aspen Mountain (ASC 2018a). This equates to an average application ratio of 1.07 acre-feet per acre of trail with snowmaking. Ultimately, this depletes approximately 47.9 acre-feet of water per year in the Colorado River Basin. Combined with depletions associated with the on-mountain restaurants and vehicle maintenance shop, the total current annual depletions at Aspen Mountain are approximately 48.30 acre-feet.



CLOCKWISE FROM TOP LEFT:
BONYTAIL CHUB, HUMPBAC CHUB, RAZORBACK SUCKER, COLORADO PIKEMINNOW

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Birds

Raptors

Listed WRNF sensitive raptors with potential habitat in the project area include the northern goshawk (*Accipiter gentilis*), boreal owl (*Aegolius funereus*), and flammulated owl (*Otus flammeolus*). On the WRNF, northern goshawks often construct their nests in either lodgepole pines or aspens. These habitat types exist within the project area; however, no northern goshawks were located during 2018 species-specific surveys within the project area.

Boreal owls are considered to be widespread in suitable habitat throughout their range. Suitable habitat consists of mature spruce, spruce/fir, or spruce/fir/lodgepole pine, most commonly in proximity to open grassy meadows. This habitat also exists within the project area; however, no boreal owls were located in the project area during 2018 tape

callback surveys conducted in suitable habitat.

Flammulated owls, like boreal owls, require cavities for nesting. In addition, they prefer open forests for catching insects and brush or dense foliage for roosting. Aspen is the most common forest cover type on the district where these small owls are found. They also utilize mixed forests of Douglas fir, lodgepole pine, and/or Engelmann spruce. Scattered records exist for flammulated owls across the WRNF and the district.

3.7.2 Environmental Consequences of the Proposed Action

The Proposed Action would be consistent with all wildlife and fisheries relevant direction provided by the [Forest Plan](#), the [Southern Rockies Lynx Management Direction](#), and [FSM 2670.32](#).



CLOCKWISE FROM
TOP LEFT:

NORTHERN
GOSHAWK
FLAMMULATED
OWL
OLIVE-SIDED
FLYCATCHER
BOREAL OWL

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Mammals

Canada Lynx

In total, approximately 159 acres of lynx vegetation would be directly impacted by the Proposed Action, and 69 of those 159 acres would be converted to non-habitat. These impacts would occur primarily with the development of the Pandora terrain and the excavation of snowmaking ponds. These direct impacts would result in impacts equal to 0.2 percent of suitable lynx habitat within the Independence Pass LAU, and this change would be insignificant at the scale of the LAU. In addition, while trail clearing and glading in the Pandora area would impact snowshoe hare habitat and therefore lynx habitat, the habitat quality has already been degraded due to backcountry use that has been occurring for decades.

The net result of the SUP area boundary adjustment would be 2.6 acres of primary lynx vegetation added to the SUP area and 3.7 acres of secondary lynx vegetation removed from the SUP area, for a grand total of 1.1 acres of lynx vegetation removed from the SUP area.

The proposed project would maintain the ability for lynx to traverse the landscape. Unlike other ski areas in Colorado, which span the elevations between non-lynx habitat in the valley floor to non-lynx habitat in the alpine zone, Aspen Mountain provides suitable lynx travel habitat below the ski areas along the flank of Richmond Ridge as well as south of the ridge. Existing public use of the Richmond Ridge area may be disruptive to lynx movements, and the scope and scale of this effect is much greater than what is anticipated as a result of the Proposed Action. While lynx may avoid otherwise suitable habitat in Pandora and elsewhere in the ski area due to skier use and presence, these areas of high skier presence

do not pose an impediment to lynx movements under the Proposed Action.

Indirect impacts to lynx resulting from implementation of the Proposed Action would be associated with increased winter skier presence (i.e., with implementation of the Proposed Action, the number of skiers utilizing the Pandora area would be greater than the estimated 0 to 100 skiers per day that currently use the area) and year-round maintenance activities. However, based on the consistent use that has occurred within the Pandora area, in conjunction with the use that has occurred within the rest of Aspen Mountain's operational boundary, it is likely that habitat effectiveness for lynx is already compromised and that lynx currently avoid the land within the operational boundary due to existing levels of human use and development.

The projects would not compromise the ability of the Independence LAU to support foraging, denning, or traveling lynx and therefore the Proposed Action **may affect, but is not likely to adversely affect**, the Canada lynx. The WRNF is currently consulting with the USFWS on this determination, and the USFWS will issue a Biological Opinion prior to the WRNF issuing a decision document on this EA.

Elk

The Proposed Action would directly impact approximately 191 acres of vegetation that provides forage and/or cover for elk in the summer. Sites that are cleared for ski trail and lift construction would continue to provide forage for elk; however, their value as cover would be reduced or eliminated. Given the proximity to other severe winter range and areas like the North Star Nature Preserve, it is possible that individual elk could be impacted from the development of the Proposed Action. However, at the scale of DAU E-15, the impact to forage and cover

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resources would not be detectable in terms of a decrease in elk survival or fecundity. Vegetation changes would not impact the DAU-15 elk population numbers. Furthermore, there was no evidence observed during the 2018 wildlife surveys that elk utilize the project area for calving and habitat features that typically characterize elk calving habitat (i.e., good cover and free water within a quarter-mile are absent).

The Proposed Action would also reallocate 22.5 acres of Management Area 7.1 – Intermix to Management Area 8.25 – Ski Areas (Existing and Potential). To achieve a no net increase of the SUP area, an equal amount of lands area currently within the current SUP area and Management Area 8.25 would be reallocated to Management Area 7.1. Wildlife objectives for Management Area 7.1 are set on a case-by-case basis, and the desired condition is to provide adequate cover for big game species between winter and summer ranges. Since the reallocated lands possess similar ecological values, and the Proposed Action would allow for the area to provide adequate habitat cover, this portion of the action alternative would have **no impact** on elk.

American Marten

Project components would impact 148.2 acres of potential marten habitat. The majority of these impacts would result from glading and ski trail clearing in spruce/fir and lodgepole pine forest. Remaining impacts would in large part result from clearing trees for the Pandora lift, new ski trails, and gladed areas. Based on the results of a study conducted on the Medicine Bow-Routt National Forest, glading would not eliminate marten habitat but would diminish habitat effectiveness by removing forest cover for martens and their prey (USDA Forest Service 2012). Forest stands cleared

for chairlifts, snowmaking ponds, power lines, and other miscellaneous project components would eliminate habitat resources for martens but would not be of a scale to preclude continued use of the remnant stand. In addition, the indirect impact of increased human presence during the winter is not expected to have an adverse effect on marten. As a result, the proposed project ***may adversely impact individuals, but is not likely to result in a lack of viability in the planning area, nor cause a trend towards federal listing.***

Hoary Bat

The Proposed Action would impact approximately 148.2 acres of forest stands that provide potential roost habitat for the hoary bat. It is possible that individuals roosting in trees within suitable habitat could be killed during tree clearing activities associated with the various components of the Proposed Action; however, the increase in winter recreation would not have an impact on bats and summer recreation is not a component of the project. Remnant conifer stands would continue to provide habitat resources for these bats upon completion of the project. As a result, the project ***may adversely impact individuals, but is not likely to result in a lack of viability in the planning area, nor cause a trend towards federal listing.***

Fish

Upper Colorado River Fish

Impacts to the Upper Colorado River fish, including the Colorado pikeminnow, razorback sucker, humpback chub, and bonytail chub would occur due to the proposed snowmaking water depletions. The current diversions and subsequent depletions, as described previously, result in 48.3 acre-feet of historic depletions. The Proposed Action would require 14.7 acre-

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feet of new depletions; therefore, the Proposed Action *may affect, is likely to adversely affect* the four Upper Colorado River fish. The WRNF is currently consulting with the USFWS on this determination, and the USFWS will issue a Biological Opinion prior to the WRNF issuing a decision document on this EA. Impacts to the Upper Colorado River fish would not be significant, as ASC would be required to offer and sign a Recovery Agreement to conclude Section 7 consultation, including a re-initiation stipulation. With the Recovery Agreement in place, the project would meet the criteria of the Colorado River Programmatic Biological Opinion and would avoid the likelihood of jeopardy and/or adverse modification of critical habitat from the depletion impacts.

Birds

Raptors

The Proposed Action would impact 155.3 acres, 72.2 acres, and 7.1 acres of potentially suitable habitat for the northern goshawk, boreal owl, and flammulated owl, respectively. Impacts to these species from the Proposed Action would be due to vegetation clearing. PDC require pre-project surveys of all project areas for northern goshawks and other nesting raptors. If a nest is found to be active by a northern goshawk, boreal owl, or flammulated owl, then a no-disturbance buffer and timing restrictions would be implemented to protect the nest until birds have fledged, which typically occurs by July 30, June 30, or July 31, respectively. With incorporation of these PDC, there would be **no impact** to the northern goshawk, boreal owl, or flammulated owl from the Proposed Action.

Olive-sided Flycatchers

The Proposed Action would impact approximately 73.4 acres of potential habitat for olive-sided flycatchers. Construction

activities associated with the proposed projects during the nesting season (May 15 to July 30) could disturb nesting adults which, if resulted in abandonment of the nest, will cause the mortality of nestlings. Because of the difficulty of detecting individual nests deep within the tree canopy, it is likely that even with focused surveys required by PDC, nests would remain undetected. Therefore, implementation of the action alternative *may adversely impact individuals, but is not likely to result in a lack of viability in the planning area, nor cause a trend towards federal listing*.

3.7.3 Cumulative Effects

In the past and present, residential and commercial expansion and development, along with increased human recreation, has fragmented habitat and/or decreased the effectiveness of available habitat for all species discussed in this analysis. Although minor direct and indirect impacts would occur to some of these TEP wildlife and WRNF sensitive species, none of these impacts would be significant or lead to a downward trend in viability across the planning area. The Proposed Action will, however, contribute to an incremental loss of habitat for some of the evaluated species.

This conclusion is supported by the fact that relevant PDC (e.g., the no-disturbance buffers and timing restrictions to protect the goshawk nests until birds have fledged) would ensure that no direct mortality would occur. This is also true for TEP aquatic species, because Aspen Mountain—through Section 7 consultation and the signing of a specific Recovery Agreement—can avoid the likelihood of jeopardy and/or adverse modification of critical habitat from the depletion impacts. Refer to the BA and BE for more detail regarding cumulative effects.

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3.8 AIR QUALITY AND CLIMATE

Federal, State, and Local Policy Guidance

The Clean Air Act, as amended (CAA) set federal maximum allowable concentrations (National Ambient Air Quality Standards [NAAQS]) for six different pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particle pollution, and sulfur dioxide. The CAA also established Class I, II, and III areas, where emissions of particulate matter are restricted. These restrictions are most severe in Class I areas and are progressively more lenient in Class II and III areas. Mandatory Class I federal lands include, but are not limited to, national wilderness areas and national parks, and federal land managers are required to protect the air quality and other resources of their Class I areas.

The Forest Service has developed specific guidance, *Climate Change Considerations in Project Level NEPA Analysis*, for how to incorporate climate change into NEPA analysis. This guidance suggests that two types of climate change effects be considered: (1) the effect of a proposed project on climate change, including greenhouse gas (GHG) emissions and carbon cycling, and (2) the potential effects of climate change on the proposed project (USDA Forest Service 2009a). In addition, the WRNF developed an *Air Resources Management Plan* in 2009 to assess current air resources conditions and trends on the WRNF, identify existing and future air quality impacts to these resources, and provide guidance for future air resource monitoring and management activities on the WRNF (USDA Forest Service 2009b). This plan identifies potential regional sources of air pollution that may impact the forest and specifies the Air Quality Related Values (AQRVs) for designated wilderness areas on the forest.

The State of Colorado Department of Public Health and Environment (CDPHE) and Colorado Air Quality Control Commission air quality regulations also apply to this proposed project (CDPHE 2017). These regulations include clean air goals and standards, permits for outdoor burning, and support of the Class I and Class II designations as described above. The City of Aspen guidance is consistent with the above regulations, programs, and permits. In addition, the City of Aspen has developed a series of city air quality regulations, including heavy-duty diesel vehicle emissions standards and fireplace and woodstove regulations (City of Aspen 2018a).

3.8.1 Affected Environment

Climate

The climate of Colorado is characterized by frequent sunshine, low humidity, and large temperature variations, and is influenced by its mountainous terrain. The elevation at Aspen Mountain ranges from approximately 8,000 feet amsl in the base area up to 11,200 feet amsl at the summit. The City of Aspen receives an average of 24.56 inches of precipitation and 175.7 inches of snow per year (WRCC 2012). The average temperature in the summer is approximately 60 degrees Fahrenheit (°F) and the average winter temperature is approximately 23°F (WRCC 2012).

The effects of climate change have already been observed in both Colorado and the north-central Colorado Rocky Mountains. In the last fifty years, the annual average temperature in Colorado has increased by 2.5°F (Lukas et al. 2014). Temperature increases are observed in all seasons, with the highest temperature increases recorded in the summer months. In addition to these temperature increases, the timing of snowmelt and peak runoff has shifted earlier,

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between one to four weeks with year-to-year variability, over the last thirty years. More frequent soil moisture drought conditions have also been observed in this timeframe, reflecting the warming trends and below average precipitation that have been observed since 2000.

A decrease in annual streamflow for rivers is predicted, due to the loss of moisture from warmer snowpack, soils, and vegetation. Dust-on-snow events may cause peak snowmelt to occur between three and six weeks earlier than historic averages. Runoff in central Colorado is predicted to occur earlier, by one to three weeks, resulting in decreasing flows in later summer. The U.S. Global Change Research Program and other scientists predict likely increases in the frequency and severity of heat waves, droughts, wildfires, and extreme precipitation events in Colorado and the American West (Lukas et al. 2014; Melillo et al. 2014). Global change models also predict this warming trend will continue into mid-century (2050) and beyond, with the statewide average annual temperature project to change +2.5°F to +5.0°F by 2050 (Gordon and Ojima 2015; Lukas et al. 2014). Summers are projected to warm more than winters and there is general agreement that winter precipitation is expected to increase, although models diverge on specific projections. These changing conditions are part of the baseline of this chapter and related resources, such as watershed resources.

Regional Air Quality

Table 3.8-1 provides a list of nearby Class I areas and their distance from the project area.

Table 3.8-1. Project Area Distance to Class I Areas

CLASS I AREA	DISTANCE FROM PROJECT AREA
Maroon Bells-Snowmass	3.6 miles southwest
West Elk Wilderness	26.7 miles southwest
La Garita Wilderness	75.7 miles south
Flat Tops Wilderness	51.9 miles northwest
Eagles Nest Wilderness	42.3 miles northeast

The nearest Class I wilderness area, the Maroon Bells-Snowmass Wilderness, provides insight into general air quality trends near the project area. Deciviews are a measure of haze and are used as a proxy for overall air quality. In the period between 2000 and 2015, the Maroon Bells-Snowmass Wilderness showed a significant improvement in visibility (e.g., a decline in deciview value) with deciview values less than a quarter the national average. For example, the national average for visibility in 2001 was 7.1 deciviews, while the visibility observed at the Maroon Bells-Snowmass Wilderness was 1.1 deciviews. Similarly, by 2015 the national average had declined to 5.1 deciviews and the level observed at Maroon Bells-Snowmass Wilderness was -0.4 deciview (USEPA 2017a). In addition, the average visual range for Maroon Bells-Snowmass Wilderness improved from approximately 115 miles to 140 miles (USEPA n.d.).

In addition, these Class I areas, as discussed above, are of particular relevance to the Prevention of Significant Deterioration provisions and AQRVs. Detailed trends of AQRVs until 2007, as well as descriptions of the relevant wilderness areas, up can be

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Plan (USDA Forest Service 2009b). Generally, Pitkin County has no major point source emissions as well as the lowest total area and minor point source emissions of all counties in Colorado (USDA Forest Service 2009b).

From the year 1980 to the year 2005, the air quality index for Pitkin County has ranged from “good” to “moderate,” with only a few instances prior to 1991 where the air was “unhealthy for sensitive groups” (USEPA 2017b). More days have been characterized as “good” than “moderate” in the more recent years, (i.e., air quality has generally improved).

NAAQS are often used as a proxy for understanding the relative air quality of a region. If an area is not located in a designated non-attainment zone for a certain pollutant, it means that it has concentrations of that pollutant that are below the levels established by the NAAQS. Due to the City of Aspen’s attainment of NAAQS, it has generally good air quality; however, Aspen was historically a PM₁₀ (particulate matter 10 microns or less in diameter) non-attainment zone. The largest source of PM₁₀ was re-entrained dust from traffic on paved roads and was primarily from vehicle mile trips that originated from outside the Aspen/Pitkin County attainment/maintenance area (USEPA 1991). The City of Aspen was granted attainment/ maintenance status in 2003. Four monitoring stations are located in the within or adjacent to Aspen Mountain: two within the City of Aspen—one for ozone and one for PM₁₀—and two on Ajax Mountain—one IMPROVE station and one ozone station (USEPA 2018). Data was only collected for ozone up until 2012. Data from these monitors, collected in 2017 for PM₁₀ and IMPROVE and in 2012 for ozone, indicate that the Aspen area has either met or was below national standards.

3.8.2 Environmental Consequences of the Proposed Action

The Proposed Action is consistent with federal, state, and local regulations regarding air quality; however, there will be impacts from the Proposed Action from construction, operation, and potential increased visitation due to the development of the projects. These impacts will be considered in the following scopes: regional air quality and climate impact.

Regional Air Quality

The Proposed Action would incur impacts from construction phase of the project through trucks and other heavy equipment for tree removal, construction, staging, pond creation, and installation of proposed infrastructure. This vehicular activity would generate GHG emissions, as would the additional electricity consumption required during construction. In addition, construction traffic could increase dust and other particulate matter in the air, which is particularly relevant to Aspen and its history of PM₁₀ non-attainment.

In some cases, vegetation and felled trees would be burned on site but would adhere to the State of Colorado Burn Permit parameters and other PDC for burning identified in the Timber Management Plan (refer to **Table 2-4**). Burning would result in the short-term release of GHG emissions, limited to the duration of the burn itself. Emissions from the projected pile burning could impact the WRNF AQRVs, like visibility. However, through the use of PDC and considering the scale of potential burning, the Proposed Action is unlikely to result in Class I area air quality degradation and impacts to air quality from pile burning are expected to be minimal.

Future changes in recreational use in the winter seasons would result in a likely

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increase in contributions to GHG emissions and possible air quality impacts as well. An increase in GHG emissions and particulate matter from increased traffic is a potential impact; however, there is not anticipated to be a substantial increase in annual visitation or traffic and therefore there is expected to be negligible changes in GHG emissions and air quality from current conditions due to traffic and visitation. Impacts to NAAQS standards and the previous PM10 non-attainment area from increased visitation are also not anticipated.

There are also expected increases in GHG emissions during the operational phase of the project from the increase in energy required for additional snowmaking, chairlift operation, and additional trail grooming. However, the location of the pump station and storage ponds mid-mountain reduces the amount of water that needs to be pumped up hill (e.g., against gravity) compared to pumping water from further down mountain, reducing required energy and associated emissions. Ongoing and intermittent maintenance would also occur but associated air quality impacts would be negligible.

Climate

As previously discussed, the Proposed Action would include the release of increased GHG emissions. The construction and operation of both the Pandora area and the snowmaking development are associated with GHG emissions and increased energy use, which also correlate to the release of GHG emissions. To decrease GHG emission, variable frequency drives would be incorporated on all three pumps at the proposed pump station to increase operational efficiency during the snowmaking season.

The project area is not located in a climatically marginal area and is generally

not considered at unreasonable risk. Variability in temperatures, such as minimum low temperatures on Aspen Mountain, may affect the residence time of natural snowfall as well as the capacity of the resort to make artificial snow. Changes in the timing, duration, intensity, and frequency of precipitation may alter the amount of natural snow, artificial snowmaking capacity, and timing of snowmelt each spring, which would affect use of and operations at Aspen Mountain. Climate change may also affect the duration, timing, and nature of visitation to the Aspen Mountain, which in turn may affect the competition operations. Watershed resource impacts from climate change on natural hydrologic cycles may also affect the resort's ability to store water and make artificial snow in the long term. However, these realities are not expected to jeopardize the viability of winter recreation at Aspen Mountain.

3.8.3 Cumulative Effects

Past and present residential and commercial expansion and development, along with increased human visitation, has resulted in GHG emissions and the release of particulate matter release and other NAAQS-regulated pollutants. These projects have been varied in timing and scope and range from 1946 when Aspen Mountain first opened as a ski area to the development of projects included in the 2018 MDP. In addition, as detailed in the MDP, there are a variety of projects predicted for the future. These future projects also have the potential for GHG emissions and the release of particulate matter release and other air quality contaminants.

Although minor air quality and GHG impacts have and will likely continue to occur, none of the past impacts have been irreversible, as seen in the improvement in the air quality index of Pitkin County over the course of the

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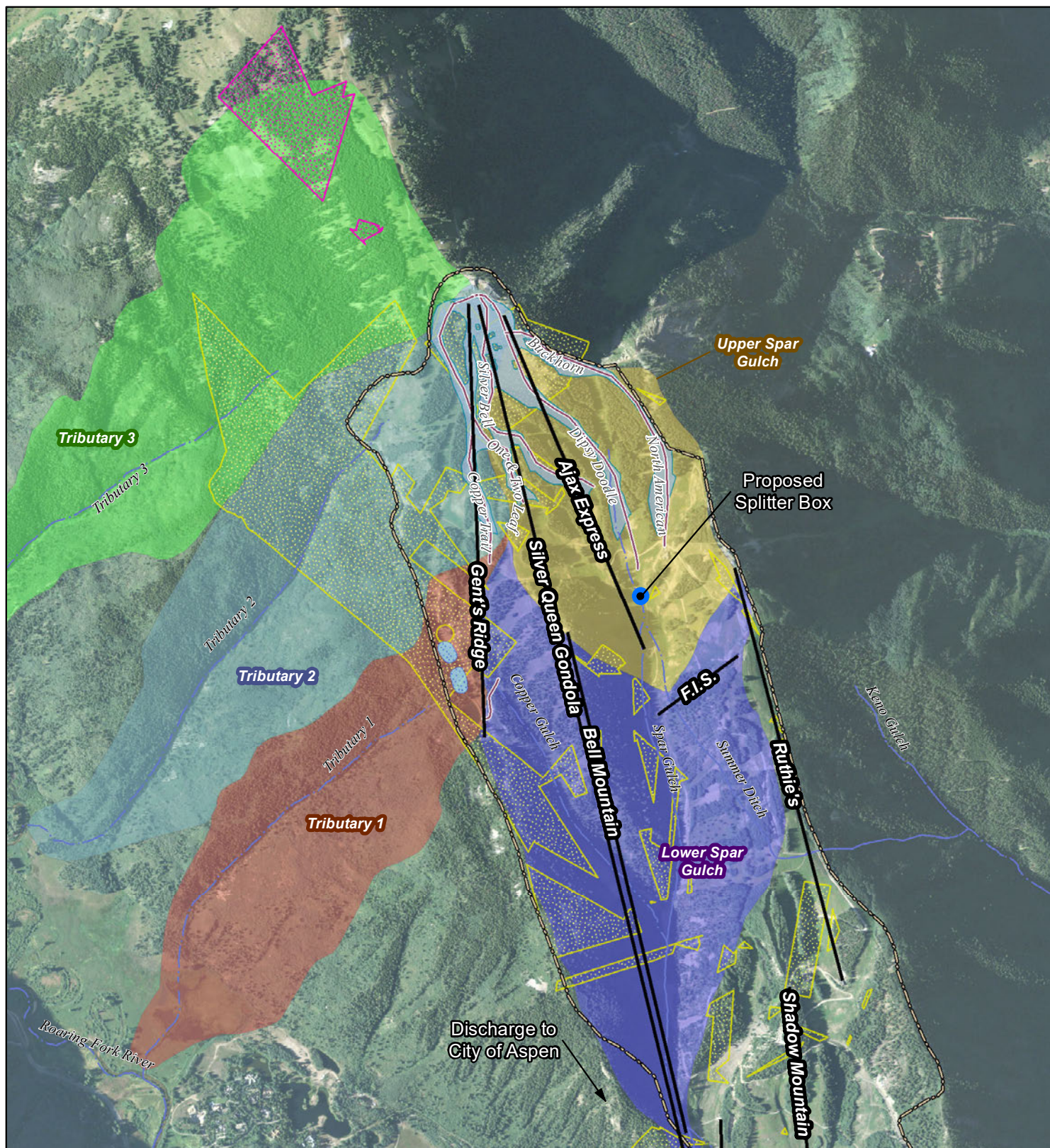
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

past thirty years, and this trend is expected to continue (USEPA 2017b).

In combination with the small additional amounts of emissions generated from the Proposed Action that contribute to Pitkin County's overall emissions, these projects may have small adverse effects on increased temperatures, water use, weather variability, and air quality degradation. These effects could increase risks such as wildfire and heavy precipitation events, change the amount and timing of snowfall and snowmelt, and affect visibility. Temperature increases, or variability may result in shortened ski seasons. Sustainability measures at Aspen Mountain and in the City of Aspen region could have a small beneficial cumulative effect on locally-produced GHG emissions, waste diversion, and water use, but may not have substantial cumulative effects that reduce the impacts of climate change in the project area. These sustainability measures include:

- ◆ Aspen Mountain sustainability initiatives, which range from equipment retrofits and the use of efficient snowmaking equipment to lobbying for increasing the amount of renewable energy in the Holy Cross Energy portfolio (ASC 2018b). Within this effort, Aspen Mountain also tracks their carbon emissions and energy use and have developed a goal to reduce emissions 25 percent below 2000 levels by 2020 (ASC 2008).
- ◆ The Pitkin County Climate Action Plan, which includes efforts to expand their compost program, increase taxi and airport MPG standards, and increase the energy efficiency of key buildings (Pitkin County 2018).

The Aspen Community Sustainability Report, which works to improve the environmental sustainability of Aspen through addressing things like levels of particulate matter pollution energy consumption in the built environment, and the percent of electrical energy from renewable sources (City of Aspen 2018b).



Pandora Development and Summit Snowmaking Projects Environmental Assessment

Figure 4
Watershed

Existing

- Chairlift
- - - Study Area Streams
- ▭ Operational Boundary
- ▨ SUP Area (MA 8.22)
- ▨ Non-SUP NFS Lands (MA 7.1)

Watersheds depicted as colored polygons

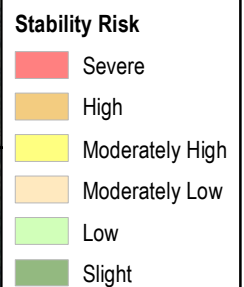
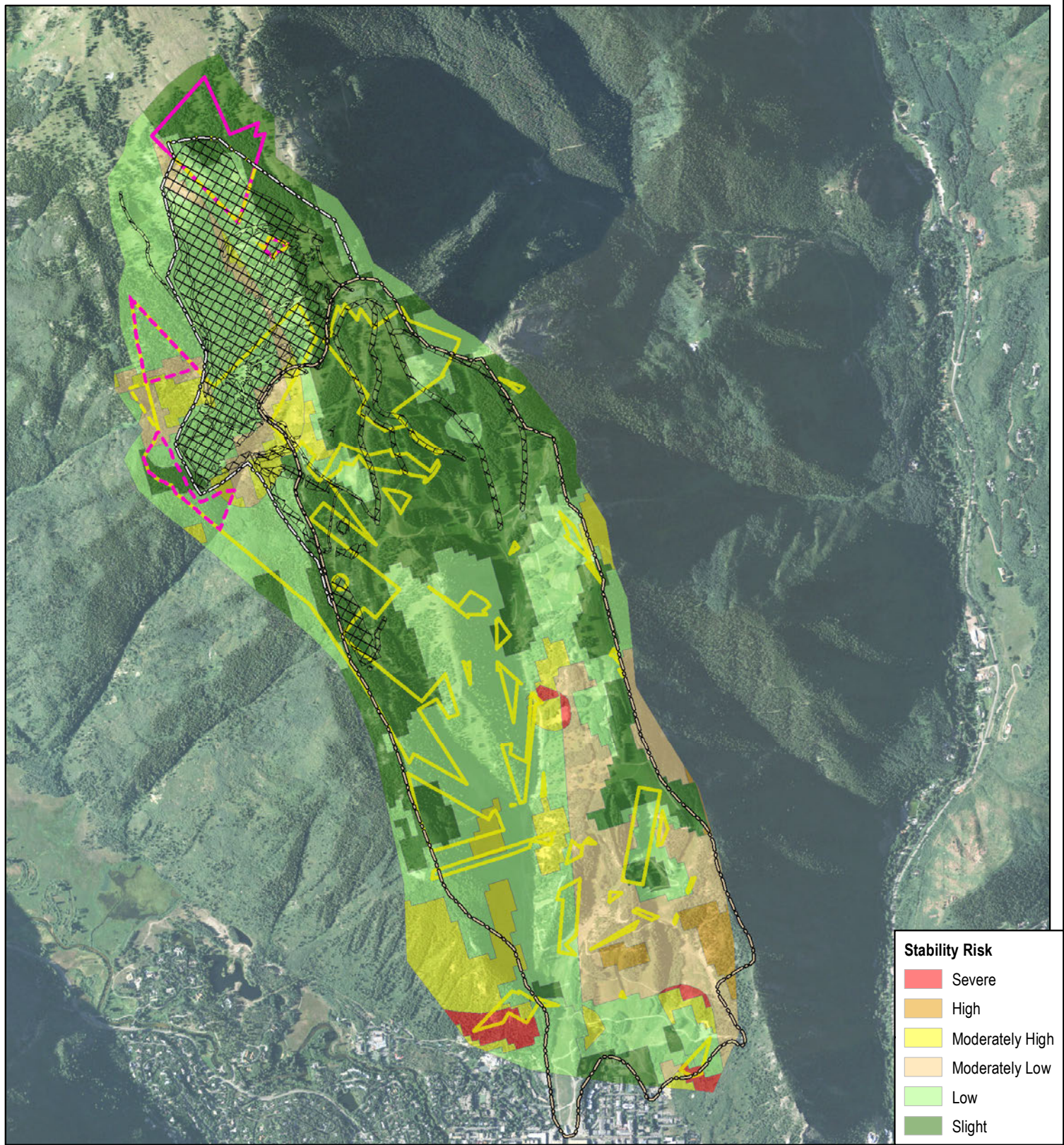
Proposed

- ▨ Gent's Ridge Snowmaking Ponds
- Snowmaking Pipe
- ▨ Snowmaking Coverage

0 1,000 2,000 Feet



November 2018. Prepared by: **SE GROUP**



Pandora Development and Summit Snowmaking Projects Environmental Assessment

*Figure 5
Soil Stability*

Proposed Action

- Operational Boundary Adjustment
- Proposed Disturbance Areas

Proposed SUP Area Adjustment

- SUP Area Increase
- SUP Area Decrease

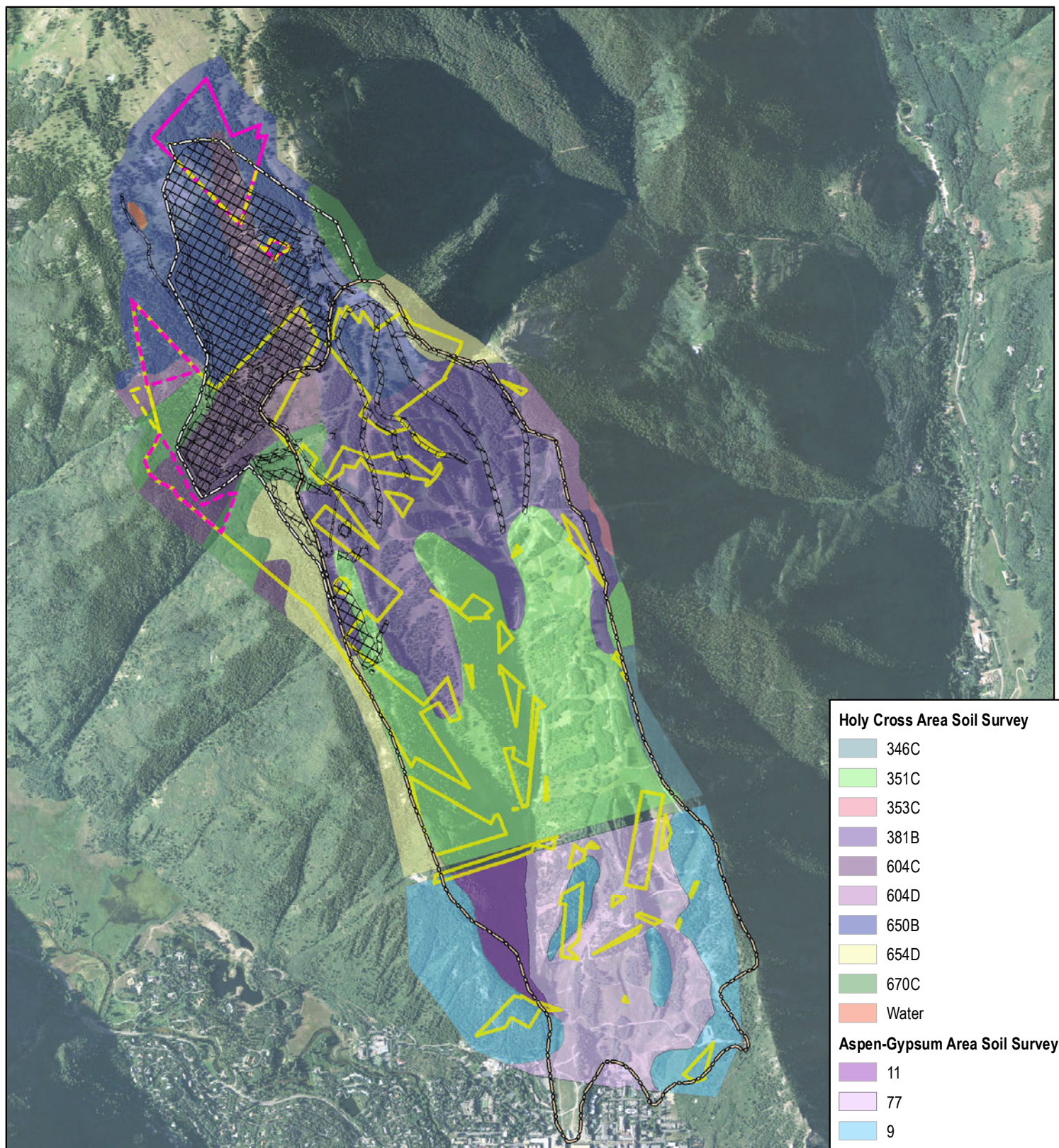
Existing

- Operational Boundary
- SUP Area (MA 8.22)
- Non-SUP NFS Lands (MA 7.1)



0 1,250 2,500 Feet

November 2018. Prepared by: **SE GROUP**



Pandora Development and Summit Snowmaking Projects Environmental Assessment

Figure 6
Soil Map Units

Proposed Action

- Operational Boundary Adjustment
- Proposed Disturbance Areas

Proposed SUP Area Adjustment

- SUP Area Increase
- SUP Area Decrease

Existing

- Operational Boundary
- SUP Area (MA 8.22)
- Non-SUP NFS Lands (MA 7.1)



0 1,250 2,500 Feet

November 2018. Prepared by: **SE GROUP**

Chapter 4.

Consultation and Coordination

4.1 PREPARERS

The following people participated in initial scoping, were members of the ID Team, Consultant Team and/or provided direction and assistance during the preparation of this EA.

Table 4-1. Forest Service ID Team

TEAM MEMBER	PROJECT RESPONSIBILITY
Scott Fitzwilliams	Forest Supervisor, Deciding Officer
Karen Schroyer	Aspen-Sopris District Ranger
Erin Carey	Aspen-Sopris Deputy District Ranger
Roger Poirier	Mountain Sports Program Manager
TJ Broom	Mountain Sports – Recreation Special Uses Program Lead
Justin Anderson	Hydrologist
Phillip Nyland	Biologist
Clay Ramey	Fisheries Biologist
Donna Graham	Landscape Architect
Liz Roberts	Botanist
Doug Leyva	Timber and Fuels Program Manager
Lynn Khuat	Soil Scientist
Thomas Fuller	Archeologist

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CONSULTATION AND COORDINATION

Table 4-2. Consultant Team

TEAM MEMBER	ORGANIZATION	PROJECT RESPONSIBILITY
Ashley Smith	SE Group	Project Manager
Scott Prior	SE Group	Environmental Analyst
Sam O'Keefe	SE Group	Environmental Analyst/GIS
Tyler Ford	SE Group	Environmental Analyst
Paula Samuelson	SE Group	Document Production
Anne McKibbin	Metcalf Archaeology	Archaeologist
Raul Passerini, PE	Resource Engineering, Inc.	Hydrologist
Kelly Colfer	Western Bionomics	Wildlife Biologist, Botanist, Wetland Ecologist

4.2 AGENCIES CONTACTED

The following federal, tribal, state and local agencies were contacted during the preparation of this EA.

Table 4-3. Agencies Contacted

GOVERNMENT	AGENCIES CONTACTED
Federal	<ul style="list-style-type: none"> • U.S. Environmental Protection Agency • U.S. Fish and Wildlife Service • U.S. Army Corps of Engineers • Bureau of Land Management
Tribal	<ul style="list-style-type: none"> • Southern Ute Indian Tribe • Ute Indian Tribe (Uintah & Ouray Reservation) • Ute Mountain Ute Tribe
State	<ul style="list-style-type: none"> • Colorado Department of Transportation • Colorado Department of Public Health and Environment • Colorado Parks and Wildlife • State Historic Preservation Office • Governor of Colorado • State Historic Preservation Office
Local	<ul style="list-style-type: none"> • City of Aspen • Pitkin County

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CONSULTATION AND COORDINATION

4.3 PUBLIC INVOLVEMENT

The following individuals and organizations commented during the combined scoping and comment period on the NOPA.

- ◆ Albert Slap
- ◆ Andy Abul
- ◆ Colorado Environmental Coalition
- ◆ David Corbin
- ◆ Deborah Overeynder
- ◆ Eric Gieszl
- ◆ Gerald Terwilliger
- ◆ J.T. Romatzke
- ◆ Jere Gimbel
- ◆ Jim Klein
- ◆ Kent Wilson
- ◆ Kristan Kaplinski
- ◆ Leo Welf
- ◆ Michael Kashinski
- ◆ Nick Thompson
- ◆ Patti Clapper
- ◆ Philip Strobel, USEPA
- ◆ Ryan Stevenson
- ◆ Will Roush

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Chapter 5

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Table 5-1. In-text Citations and Full Reference

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Chapter 5

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Table 5-1. In-text Citations and Full Reference (cont.)

IN-TEXT CITATION	FULL REFERENCE
Lukas et al. 2014	Lukas, J., J. Barsugli, N. Doesken, I. Rangwala, and K. Wolter. 2014. Climate Change in Colorado, A Synthesis to Support Water Resources Management and Adaptation, Second Edition, A Report for the Colorado Water Conservation Board, Cooperative Institute for Research in Environmental Sciences. August.
McCalpin 2010	McCalpin J.P. Geologic And Hydrologic Impacts Of 2010 Proposed Improvements On Aspen Mountain, Pitkin County, Colorado. November 2010.
Melillo et al. 2014	Melillo, J.M., T.C. Richmond, and G.W. Yohe (eds). 2014. Highlights of Climate Change Impacts in the United States: The Third National Climate Assessment. U.S. Global Change Research Program, 148 pp.
Metcalf 2018	Metcalf Archaeological Consultants. 2018. Class III Cultural Resources Inventory of the 2018 Proposed Aspen Pandora Lift at Aspen Ski Resort in Pitkin County, Colorado, USFS Report Number R2018021500030.
Pitkin County 2018	Pitkin County Government. 2018. Pitkin County Climate Action Plan. Available at: https://www.pitkincounty.com/DocumentCenter/View/14694/Climate-Action-Plan?bidId=
Resource Engineering 2018a	Resource Engineering, Inc. 2018. Hydrology Report. Aspen Pandora Development and Summit Snowmaking Projects, Aspen Mountain. Prepared for Aspen Skiing Company. September.
Resource Engineering 2018b	Resource Engineering, Inc. 2018. Snowmaking Water Availability Analysis. May.
USDA Forest Service 1998	USDA Forest Service. 1998. White River National Forest Soils Dictionary for the Holy Cross Survey.
USDA Forest Service 2002	USDA Forest Service. 2002. Land and Resource Management Plan – 2002 Revision. Available at: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_000999.pdf
USDA Forest Service 2009a	USDA Forest Service. 2009. Climate Change Considerations in Project Level NEPA Analysis. Available at: https://www.fs.fed.us/emc/nepa/climate_change/includes/cc_nepa_guidance.pdf .
USDA Forest Service 2009b	USDA Forest Service. 2009. White River National Forest Air Resource Management Plan. Available at: https://www.fs.usda.gov/detail/whiteriver/landmanagement/?cid=fsbdev3_001237 .
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USDA Forest Service 2012	USDA Forest Service. 2012. Unpublished data on file at the MBR-Hahn’s Peak Bears Ears District Office, Steamboat Springs, CO.
USDA Forest Service 2018	USDA Forest Service, White River National Forest. Aspen-Sopris Ranger District. Notice of Proposed Action for Scoping and Comment Period. Aspen Mountain. Pandora Development and Summit Snowmaking Projects. May.

Chapter 5

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Table 5-1. In-text Citations and Full Reference (cont.)

IN-TEXT CITATION	FULL REFERENCE
USEPA 1980	United States Environmental Protection Agency. WRENS: An Approach to Water Resources Evaluation of Nonpoint Silvicultural Sources (A Procedural Handbook). EPA-600/8-80-012. Washington DC: U.S. Environmental Protection Agency.
USEPA 1991	United States Environmental Protection Agency. 1991. Aspen/Pitkin County PM-10 Attainment/Maintenance Area. Available at https://www.epa.gov/sites/production/files/2017-12/documents/table_c_cononattainment_attainment_maintenance_areas.pdf
USEPA 2017a	United States Environmental Protection Agency. 2017. Our Nation's Air, 2017 Trends Report. Available at: https://gispub.epa.gov/air/trendsreport/2017/#home .
USEPA 2017b	United States Environmental Protection Agency. 2018. Air Data – Multiyear Tile Plot for All Air Quality Index Pollutants, Pitkin County, Colorado. Available at: https://www.epa.gov/outdoor-air-quality-data/air-data-multiyear-tile-plot .
USEPA 2018	United States Environmental Protection Agency. 2018. AirData Air Quality Monitors Interactive Map. Available at https://www.epa.gov/outdoor-air-quality-data/interactive-map-air-quality-monitors
USEPA n.d.	United States Environmental Protection Agency. n.d. Protecting Our Nation's Treasured Vistas. Available at: https://epa.maps.arcgis.com/apps/Cascade/index.html?appid=e4dbe2263e1f49fb849af1c73a04e2f2
USFWS 1993	U.S. Fish and Wildlife Service. 1993. Section 7 consultation, sufficient progress, and historic projects agreement and Recovery Action Plan Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin. USFWS Region 6, Denver CO.
USFWS 1999	U.S. Fish and Wildlife Service. 1999. Final programmatic biological opinion for Bureau of Reclamation's operations and depletions, other depletions, and funding and recovery program actions in the upper Colorado River above the confluence with the Gunnison River. USFWS Grand Jct. CO.
USGS 1997	United States Geological Survey. 1997. Results of Site Investigation and Instrumentation of the Keno Gulch Landslide/Debris-Flow Source Area, Aspen, Colorado. Open File Report 97-717.
Western Bionomics 2018a	Western Bionomics, Inc. 2018. Biological Evaluation, Aspen Pandora Development and Summit Snowmaking Projects, Aspen Mountain. Prepared for Aspen Skiing Company. September.
Western Bionomics 2018b	Western Bionomics, Inc. 2018. Biological Assessment, Aspen Pandora Development and Summit Snowmaking Projects, Aspen Mountain. Prepared for Aspen Skiing Company. September.
WRC 2001	WRC Engineering, Inc. Surface Drainage Master Plan for the City of Aspen. Prepared for the City of Aspen, Colorado. November, 2001.
WRCC 2012	Western Regional Climate Center. 2012. Data for Aspen, Colorado. Available at: https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?co0372

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Appendix A. Forest Plan Amendment

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A. INTRODUCTION

Under the National Forest Management Act (NFMA) and its implementing regulations at 36 CFR Part 219 (2012 Planning Rule), a plan may be amended at any time (36 CFR § 219.13(a)). Plan amendments may be broad or narrow, depending on the need for the change. The Forest Service has the discretion to determine whether and how to amend the 2002 White River National Forest Land and Resource Management Plan (Forest Plan), and to determine the scope and scale of any amendment (36 CFR § 219.13(a)).

B. AMENDMENT CONSISTENT WITH FOREST SERVICE NEPA PROCEDURES (§ 219.13(B)(3))

The effects of the proposed plan amendment are documented in the Aspen Mountain Pandora Development and Summit Snowmaking Projects Environmental Assessment (EA) following Forest Service National Environmental Policy Act (NEPA) procedures at 36 CFR Part 220. A change of Management Area prescription in and of itself would not be considered a significant change in the plan for the purposes of the NFMA, and the proposed projects are not anticipated to result in significant impacts (40 CFR § 1508.27). Therefore, an EA was prepared to analyze the effects of this project (36 CFR § 219.13(b)(3)).

C. HOW THE 2012 PLANNING RULE APPLIES TO THE PLAN AMENDMENT

The proposed amendment to the Forest Plan has been prepared under the 2012 Planning Rule. The 2012 Planning Rule replaced the 1982 planning procedures that the Forest Service used to develop the existing Forest Plan. The proposed amendment, therefore, must comply with the procedural provisions of the 2012 Planning Rule, not the obsolete 1982 rule.

D. PURPOSE OF THE PLAN AMENDMENT (36 CFR § 219.13(B)(1))

The purpose of this amendment is to convert approximately 22.5 acres currently within Management Area 7.1 – Intermix to Management Area 8.25 – Ski Areas (Existing and Potential). This conversion would be prompted by the adjustment of Aspen Mountain’s SUP boundary to include these 22.5 acres, and Aspen Mountain’s intention to use this adjusted area for downhill skiing and winter sports. To achieve a no net increase of the SUP area, an equal amount of lands currently within the SUP area and Management Area 8.25 would be removed from the SUP area and reallocated to Management Area 7.1. The 22.5 acres of land currently within Aspen Mountain’s SUP area that would be withdrawn possess similar ecological values to those lands proposed for inclusion in Aspen Mountain’s SUP.

A plan amendment is required to change how or where one or more plan components apply to all or part of the plan area, including management areas or geographic area (36 CFR § 219.13(a)). The action of adjusting Aspen Mountain’s SUP boundary as proposed and the resulting Management Area conversion would, therefore, require a plan amendment.

One alternative was considered by the ID Team during development of the Aspen Mountain Environmental Assessment that would not require a SUP boundary adjustment and resulting Management Area conversion, and would, therefore, not require a plan amendment. That

alternative was the No Action Alternative, but this did not meet the Purpose and Need for the project and was eliminated from detailed analysis in this EA.

E. COMPLIANCE WITH THE 2012 PLANNING RULE'S PROCEDURAL PROVISIONS

The following sections demonstrate the amendment's compliance with the procedural provisions of the 2012 Planning Rule.

Using the Best Scientific Information to Inform the Planning Process (§ 219.3)

To identify the potential direct, indirect, irretrievable, irreversible, and cumulative impacts that may result from converting approximately 22.5 acres currently within Management Area 7.1 – Intermix to Management Area 8.25 – Ski Areas (Existing and Potential), the most accurate, reliable, and relevant information was considered in this EA.

Providing Opportunities for Public Participation (§ 219.4) and Providing Public Notice (§ 219.16 and § 219.13(b)(2))

The public was provided an opportunity to comment on the proposed Forest Plan amendment during the 30-day project scoping period, initiated by a Notice of Proposed Action (NOPA) and legal notice issued on May 16, 2018.

As allowed by § 219.16.13(b)(2), required public notifications of plan amendments may be combined where appropriate. The scoping and comment period provided the public notification of the Forest Plan amendment. The comment period lasted 30 days (36 CFR § 219.16(a)(2)). Public notifications were made by publication of a legal notice in the *Glenwood Springs Post Independent*; by posting the notification on the project website; and by mailing or e-mailing notifications to interested or affected parties per § 219.4(1) and (2).

Individuals and entities who submitted substantive formal comments related to the plan amendment during designated opportunities for public comment will also have opportunity to file an objection to the proposed project and plan amendment (36 CFR § 219.53). This was the only such designated opportunity for this project.

Format for Plan Components (§ 219.13 (b)(4) and § 219.7(e))

The plan amendment would not alter the content of plan components, but the amendment would change the management area boundaries within the project area, which would alter which plan components are applicable to the project area.

Plan Amendment Process (§ 219.7(c))

As previously stated, public notice of the amendment and opportunity to comment was provided at the time of scoping and publication of the NOPA for the Aspen Mountain Pandora Development and Summit Snowmaking Projects EA. Additionally, the effects of this amendment are analyzed and disclosed in conjunction with this project's EA, as well as on the Forest Service [website](#).

Objection Opportunity (§ 219.50 through § 219.62)

The plan amendment would apply to all future projects or activities within the 22.5-acre SUP boundary adjustment; therefore, the 2012 Planning Rule's objection process applies, but only to the plan amendment. The review process of 36 CFR Part 218 would apply to the project part of the decision (36 CFR § 219.59(b)). Draft decision documents and all notices of the opportunity to comment on the draft decision will clearly indicate which part of the draft decision is subject to the objection process and which part of the draft decision is subject to the review procedures of 36 CFR Part 218, and an explanation of those procedures.

Under the 2012 Planning Rule, a plan amendment is not subject to objection when the responsible official receives no substantive formal comments on the proposal during the opportunities for public comment (36 CFR § 219.51(a)). Should substantive comments be received, an objection to the plan amendment, including attachments, must be filed with the appropriate reviewing officer within 60 days of the date of publication of the public notice for the objection process (36 CFR § 219.56(a)).

Should no objection to the plan amendment be filed, approval of the plan amendment may occur on, but not before, the fifth business day following the end of the objection-filing period. Should an objection(s) to the plan amendment be filed and found to have standing, a decision document concerning the plan amendment cannot be issued until the reviewing officer has responded in writing to all objections, which must occur no greater than 90 days following the end of the objection-filing period (36 CFR § 219.58)

Effective Date (§ 219.17(a)(2))

The plan amendment would be effective 30 days after publication of notice of its approval (36 CFR § 219.17(a)(2)).

F. DOCUMENTING COMPLIANCE WITH THE 2012 PLANNING RULE'S APPLICABLE SUBSTANTIVE PROVISIONS

The 2012 Planning Rule requires that those substantive provisions within § 219.8 through § 219.11 that are directly related to the amendment must be applied to the amendment. The applicable substantive provisions apply only within the scope and scale of the amendment.

As explained in the discussion that follows, both the purpose and effects of the amendment are such that any adverse effects or lessening of protections of any of the provisions within § 219.8 through § 219.11 are not directly related to this amendment or substantial.

Scope and Scale of the Plan Amendment

The scope and scale of the proposed plan amendment is site-specific, applying to a specific area of 22.5 contiguous acres, and covers only a small portion of the WRNF. It would apply to all future projects and activities within this 22.5-acre area, as well as all resources within this area. This plan amendment would be effective for the life of the current Forest Plan.

The plan amendment would alter the management emphasis, actions, measures, and prescriptions of the 22.5 acres that would be converted from Management Area 7.1 – Intermix to Area 8.25 – Ski Areas (Existing and Potential). As Management Area 8.25, this 22.5-acre area would be

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expected to function as a ski area and future ski area-related projects would likely be proposed beyond what are included in the Aspen Mountain Pandora Development and Summit Snowmaking Projects EA, though any future projects would require separate and appropriate NEPA analysis. Conversely, the plan amendment would also alter the management emphasis, actions, measures, and prescriptions of the 22.5 acres that would be converted from Management Area 8.25 – Ski Areas (Existing and Potential) to Management Area 7.1 – Intermix. As Management Area 7.1, the area would be expected to function as the interface between National Forest System lands and other public and private lands. As Management Area 7.1, no future ski area projects are expected.

Rule Provisions Directly Related to the Amendment

The rule requires that substantive rule provisions (§ 219.8 through 219.11) that are directly related to the amendment must be applied to the amendment. A determination that a rule provision is directly related to the amendment is based on any one or more of the following criteria:

- 1) The purpose of the amendment (§ 219.13(b)(5)(i));
- 2) Beneficial effects of the amendment (§ 219.13(b)(5)(i));
- 3) Substantial adverse effects associated with a rule requirement (§ 219.13(b)(5)(ii)(A));
- 4) Substantial lessening of protections for a specific resource or use (§ 219.13(b)(5)(ii)(A)); and
- 5) Substantial impacts to a species or substantially lessening protections for a species (§ 219.13(b)(6)).

Applying these criteria, and having considered the preliminary NEPA analysis, it has preliminarily been determined that the proposed amendment does not have substantial adverse effects and does not substantially lessen protections.

Other Substantive Provisions

The responsible official is not required to apply any substantive requirements that are not directly related to the amendment. For the remaining substantive provisions from the 2012 Planning Rule, the project has no significant effect as explained below.

§ 219.8 Sustainability

- § 219.8(a)(1) Ecological Sustainability – Ecosystem Integrity – Ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area are adequately protected by existing Forest Plan guidance. The amendment would have direct, indirect, and cumulative impacts on ecological integrity within the areas proposed for Management Area conversion; however, these impacts would not be significant at the ecosystem scale due to the limited scope and scale of the proposed Management Area conversion.
- § 219.8(a)(2) Ecological Sustainability – Air, Soil, and Water – Air quality, soils and soil productivity, water quality, and water resources are addressed in the Forest Plan and project specific design criteria will be developed as part of the Construction Implementation Plan to reduce resource concerns. The amendment would have direct, indirect, and cumulative impacts on these resources within the areas proposed for Management Area conversion;

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however, these impacts would not be significant at the ecosystem scale due to the limited scope and scale of the proposed Management Area conversion.

- § 219.8(a)(3) Ecological Sustainability – Riparian Areas – There are no riparian areas within the areas proposed for Management Area conversion; therefore, there would be no direct, indirect, or cumulative impacts on the ecological sustainability of riparian areas.
- § 219.8(a)(4) Ecological Sustainability – Best Management Practices for Water Quality – Existing Forest Plan standards address best management practices for water quality by matching regional Water Conservation Practices Handbook management measures.
- § 219.8(b) Social and Economic Sustainability – The amendment would not have a direct effect that is outside the scope of existing Forest Plan direction on social and economic sustainability.
- § 219.8(b)(2) Social and Economic Sustainability – Sustainable Recreation – The amendment has been designed to be compliant with recreation direction in the Forest Plan regarding sustainable recreation including recreation settings, opportunities, access, and scenic character.
- § 219.8(b)(5) Social and Economic Sustainability – Cultural and Historic Resources and Uses – The amendment would have no effect on Forest Plan direction for cultural and historic resources, or management of areas of tribal importance. The project does not occur in areas of tribal importance.

§ 219.9 Diversity of Plant and Animal Communities

- § 219.9(a) Ecosystem Plan Components – Ecosystem plan components to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area are adequately addressed by existing Forest Plan guidance and project-specific measures are in place to reduce resource concerns. The amendment would have direct, indirect, and cumulative impacts on terrestrial and aquatic ecosystems and watersheds within the areas proposed for Management Area conversion; however, these impacts would not be significant at the ecosystem scale due to the limited scope and scale of the proposed Management Area conversion.
- § 219.9(b) Additional, Species-Specific Plan Components – Species-specific plan components are adequately addressed by existing Forest Plan guidance. The amendment would have direct, indirect, and cumulative impacts on plant and animal communities within the areas proposed for Management Area conversion; however, these impacts would not be significant at the ecosystem scale due to the limited scope and scale of the proposed Management Area conversion.
- § 219.9(c) – Species of Conservation Concern – Species of conservation concern are adequately addressed by existing Forest Plan guidance and project-specific measures are in place to reduce resource concerns.

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§ 219.10 Multiple Use

- § 219.10(a) Integrated Resource Management for Multiple Use – The limited scope and scale of the plan amendment has no direct impact on integrated resource management to provide for ecosystem services and multiple uses.
- § 219.10(b)(1)(i) Requirements for Plan Components for a New Plan or Plan Provision – Sustainable Recreation – The proposed plan amendment has been designed to be compliant with recreation direction in the Forest Plan regarding sustainable recreation, including recreation settings, opportunities, access, and scenic character.
- § 219.10(b)(1)(ii) Requirements for Plan Components for a New Plan or Plan Provision – Protection of Cultural and Historic Resources – The proposed Management Area conversion would have no effect on Forest Plan direction for cultural and historic resources.
- § 219.10(b)(1)(iii) Requirements for Plan Components for a New Plan or Plan Provision – Management of Areas of Tribal Importance – The proposed Management Area conversion would have no effect on Forest Plan direction for management of areas of tribal importance. The proposed Management Area conversion does not occur in areas of tribal importance.
- § 219.10(b)(1)(iv) Requirements for Plan Components for a New Plan or Plan Provision – Congressionally Designated Wilderness – The proposed Management Area conversion would have no effect on Forest Plan direction for congressionally designated areas or areas recommended for wilderness designation. The proposed Management Area conversion does not occur in areas of wilderness or recommended wilderness.
- § 219.10(b)(1)(v) Requirements for Plan Components for a New Plan or Plan Provision – Wild and Scenic Rivers – The proposed Management Area conversion would have no effect on Forest Plan direction for wild and scenic rivers. The proposed Management Area conversion does not occur in areas of wild or scenic rivers, or rivers found eligible or determined suitable for the National Wild and Scenic River system.
- § 219.10(b)(1)(vi) Requirements for Plan Components for a New Plan or Plan Provision – Appropriate Management of Other Designated Areas – Aside from the Management Area assignments, no other designations or proposed designations are present within the proposed 22.5-acre Management Area conversion area.
- § 219.10(b)(2)(vi) Requirements for Plan Components for a New Plan or Plan Provision – Other Plan Components – No other components for integrated resource management to provide for multiple use have been identified as potentially impacted by the proposed plan amendment.

§ 219.11 Timber Requirements based on the NFMA

The proposed Management Area conversion is compliant with existing Forest Plan guidance regarding: lands not suited for timber production; timber harvest for purposes other than timber production; timber harvesting in the plan area on a sustained-yield basis; timber harvest of even-aged stands for regeneration, including maximum openings; and protections for soil slope or other watershed conditions, and protection of soil, watershed, fish, wildlife, recreation, and aesthetic resources related to timber harvest (219.11(a), 219.11(c), 219.11(d)(2), 219.11(d)(3), 219.11(d)(4), 219.11(d)(5), 219.11(d)(6), 219.11(d)(7)).

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Project and Activity Consistency with the Plan

All future projects and activities must be consistent with the amended plan. With respect to determinations of project consistency with other plan provisions, the Forest Service's prior interpretation of consistency (that the consistency requirement applies only to plan standards and guidelines) applies (Forest Service Handbook 1909.12, Chapter 20, Section 21.33).

Appendix B. Finding of No Significant Impact

Analysis presented in the EA indicates that the Proposed Action would not, individually or cumulatively, significantly affect the quality of the human, biological, or physical environment; thus, an environmental impact statement would not be required. CEQ Regulations ([40 CFR 1508.13](#)) establish the definition of significance with respect to evaluating the effects of the project. The provisions of [40 CFR § 1508.27](#) indicate that project significance must be judged in terms of both *context* and *intensity*, defined as follows:

1) CONTEXT

The significance of an action must be analyzed in several contexts and varies with the setting. In the case of site-specific actions, significance depends more on the effects in the locale rather than the world as a whole. Both short- and long-term effects are relevant. The direct and indirect effects analysis contained in the EA focuses on the Aspen Mountain project area, and extends further for cumulative effects analysis, depending on the resource.

2) INTENSITY

The finding of no significant impact is based on the intensity of effects using the ten factors identified in [40 CFR § 1508.27\(b\)](#). Intensity is a measure of the severity, extent, or quantity of effects, and is based on information from the effects analysis of the EA and the references in the project file. An initial screen was conducted to ensure that the Proposed Action is consistent with the [Forest Plan](#). Additionally, the ID Team considered the effects of the project appropriately and thoroughly with an analysis that is responsive to concerns and issues raised by the public. They considered the environmental effects using relevant scientific information and their knowledge of site-specific conditions gained from field visits.

1) Consideration of both beneficial and adverse impacts.

Both the beneficial and adverse impacts associated with the Proposed Action are presented in the EA. The Proposed Action would provide recreational benefits to users of the WRNF and would improve recreation opportunities on NFS lands. Any adverse resource impacts are thoroughly documented in Chapter 3 of the EA and are determined to be avoidable and non-significant. Other issues and resources were not included in detailed analysis in the EA due to a lack of anticipated impacts. The finding of no significant environmental effects is not biased by beneficial effects of the action.

2) Consideration of the effects on public health and safety.

Although there are inherent risks associated with lift-served alpine skiing, and there are known slope stability concerns on Aspen Mountain and adjacent areas, namely the Keno Gulch area, the Proposed Action includes mitigation to reduce effects so that the Proposed Action does not significantly affect public health or safety.

3) Consideration of the unique characteristics of the geographic area.

There are no unique characteristics of the geographic area affected by the Proposed Action.

Appendix B

FINDING OF NO SIGNIFICANT IMPACT

4) Consideration of the degree to which the effects on the quality of the human environment are likely to be considered controversial.

The term “controversial” in this context refers to cases where substantial scientific dispute exists as to the size, nature, or effects of a major federal action on some human environmental factor rather than to public opposition of a proposed action or alternative.

No scientific dispute exists regarding the Proposed Action or the analysis contained in the EA. Based on the fact that the Forest Service has analyzed and approved numerous projects of this type, the effects of this project are not considered to be controversial, nor is there scientific dispute about these effects.

5) Consideration of the degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

The Proposed Action is similar to projects common at ski areas that operate on NFS lands. The analysis shows the effects are not uncertain, and do not involve unique or unknown risks. Therefore, based on the Forest Service’s experience with implementing these types of activities, as well as the requirement to implement PDC to minimize effects, there would not be significant effects on the human environment.

6) Consideration of the degree to which this action may establish a precedent for future actions with significant effects or that it represents a decision in principle about future considerations.

This decision would not establish a precedent for future actions with significant risks to the environment. The Proposed Action is consistent with forest-wide and Management Area 8.25 direction, as well as the Aspen Mountain SUP. Furthermore, the approved projects and activities are common at a developed resort such as Aspen Mountain.

7) Consideration of the action in relation to other actions with individually insignificant but cumulatively significant impacts.

The Cumulative Effects analyses presented for each resource throughout Chapter 3 in the EA disclose past, present, and reasonably foreseeable future actions with potential to lead to effects which are cumulative in nature. Due to avoidance, project-specific PDC, and the implementation of Best Management Practices, the analysis does not identify any cumulatively significant impacts that are anticipated to result from implementation of the Proposed Action.

8) Consideration of the degree to which the action may affect listed or eligible historic places.

During the Class III cultural resource inventory completed for the Proposed Action, 37 sites of various sources were identified. The sites were either not recommended eligible for the NRHP or were non-supporting elements of the eligibility. A recommendation of no adverse effect to historic properties was made. No further work or site avoidance was recommended. No active cultural resource monitoring or changes in the design of the undertaking are necessary for the protection of historic properties.

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FINDING OF NO SIGNIFICANT IMPACT

9) Consideration of the degree to which the action may adversely affect an endangered or threatened species or its critical habitat.

The Proposed Action is consistent with [Section 7\(d\) of the Endangered Species Act](#). The Proposed Action would affect Canada lynx and the four Upper Colorado River fish (Colorado pikeminnow, razorback sucker, humpback chub, and bonytail chub).

For Canada lynx, the determination is “may affect, not likely to adversely affect.” The Proposed Action would result in vegetation clearing in potential Canada lynx habitat, which may affect but is not likely to adversely affect Canada lynx and lynx habitat. While trail clearing and glading in the Pandora area would impact snowshoe hare habitat and therefore the ability of lynx to hunt for them, the area would likely have already been degraded in terms of hare habitat quality due to backcountry use that has been occurring for decades. Based on the consistent use that has occurred within the Pandora area, in conjunction with the use that has occurred within the rest of Aspen Mountain’s operational boundary, it is likely that habitat effectiveness for lynx is already compromised and that lynx currently avoid the land within the operational boundary due to existing levels of human use and development. The Proposed Action is consistent with all applicable lynx-related provisions of the [Southern Rockies Lynx Management Direction](#) and the associated [Final Environmental Impact Statement](#) and [Record of Decision](#).

The determination for the four Upper Colorado River fish is “may affect, likely to adversely affect.” The WRNF is currently consulting with the USFWS on this determination, and the USFWS will issue a Biological Opinion prior to the WRNF issuing final a decision document on this EA. Impacts to the Upper Colorado River fish would not be significant, as ASC would be required to offer and sign a Recovery Agreement to conclude Section 7 consultation, including a re-initiation stipulation. With the Recovery Agreement in place, the project would meet the criteria of the Colorado River Programmatic Biological Opinion and would avoid the likelihood of jeopardy and/or adverse modification of critical habitat from the depletion impacts.

10) Consideration of whether the action violated federal, state, or local laws or requirements imposed for the protection of the environment.

Based on information disclosed in the EA, the Biological Assessment, the Biological Evaluation, and the project file, no federal, state, or local laws, regulations, or requirements for protection of the environment would be violated with implementation of the Proposed Action, including: USFWS’s [Endangered Species Act Informal Section 7 Consultation](#); U.S. Army Corps of Engineers’ [Clean Water Act 404 Permit](#); State of Colorado’s [Stormwater Management Plan](#) and [Burn Permit](#); [Executive Order 11990, Protection of Wetlands](#); and [Executive Order 11988, Floodplain Management](#).